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LOWER COLORADO RIVER PROPOSED GENERAL PERMIT MAIN  
REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT (U) ARMY  
ENGINEER DISTRICT LOS ANGELES CA APR 82

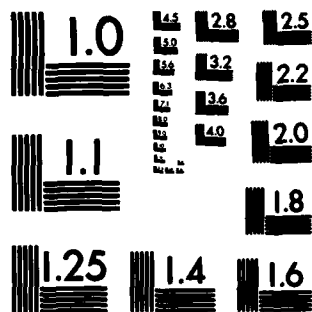
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  The lower Colorado River and its borderlands are a multi-jurisdictional area which involved many agencies in its development. As a result residents and property owners are unsure of which agencies are involved in the development permitting process. To expedite issuing many permit applications, the Corps of Engineers proposes to issue a General Permit to allow certain types of construction along the river area. The data in this document provide the basis for the General Permit application for construction of projects in low environmental sensitivity areas.		



LOWER COLORADO RIVER  
PROPOSED GENERAL PERMIT

MAIN REPORT AND FINAL ENVIRONMENTAL  
IMPACT STATEMENT

COUNTIES OF

Coconino, Mohave, Yuma, Arizona  
San Bernardino, Riverside, Imperial, California  
Clark, Nevada

U.S. ARMY ENGINEER DISTRICT  
LOS ANGELES, CALIFORNIA

MARCH 1982

# LOWER COLORADO RIVER PROPOSED GENERAL PERMIT

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## 1. INTRODUCTION

The Los Angeles District of the Corps of Engineers (the District) has permitting control over all construction projects within or over the lower Colorado River, and the discharge of fill materials into the river and its adjacent wetlands. This regulatory authority is mandated by Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act of 1977. In past years permit applications have been evaluated on a case-by-case basis requiring a separate environmental assessment for each action. Because the magnitude of most actions proposed along the river is relatively minor, predicted impacts of each action are generally not significant. Due to the individual nature of the review, cumulative impacts have proven difficult to address. Hence, permits have been approved for almost every project requested by public or private parties along the river. As a result, many valuable resources along the river are threatened by the continuation of current development trends.

The Colorado River and its borderlands are a multi-jurisdictional area. The District shares responsibilities in this area with other state and federal agencies such as the U.S. Fish and Wildlife Service, Environmental Protection Agency, Arizona Game and Fish Department, California Department of Fish and Game, the Bureau of Reclamation, Arizona Lands Commission, California State Lands Commission, and the Coast Guard. As a result, many residents and property owners are unsure of which agencies are involved in the development permitting process. In most cases, permit application must be made to two agencies which then conduct separate assessments. As a result, long periods of time elapse between application and approval or denial. Some property owners have constructed unauthorized structures to avoid such permit delays. Such structures may not meet public objectives.

As a method of expediting the large number of permit applications for specific types of development along the Colorado River and to sensitize the assessment to cumulative environmental concerns, the District proposes to issue a General Permit. The purpose of this General Permit is to allow certain types of construction to occur in designated areas under District jurisdiction without requiring an Individual Permit review, provided that the proposed project meets specified requirements. The data contained in this document provide the basis for the designation of General Permit areas to allow blanket authorization for specific developments in areas with low sensitivity ratings for aquatic and terrestrial biology, cultural resources, public safety, land use, and recreational use. Two alternative actions are also analyzed with respect to the above-mentioned parameters. These alternatives are the placement of a moratorium on further permit issuance, and a no-action alternative which allows for continued processing of applications on an individual basis.

## 2. PROBLEM IDENTIFICATION

### CORPS OF ENGINEERS PERMITTING PROCESS

#### Legislative Authority

Pursuant to the River and Harbor Act of 1899, the Corps of Engineers is responsible for regulating the provision of structures or activities in or affecting the navigable waters of the United States. Historically, the purpose of the River and Harbor Act has been to foster commerce under the Commerce Clause of the U.S. Constitution by regulating potential obstructions to navigation. However, due to recent changes in public attitudes regarding water resources and the recreational and biological value they represent, the concept of "navigability" has obtained a broader definition within the Corps of Engineer's regulatory authority. With passage of Section 404 of the Clean Water Act of 1977 the term "navigable waters" is administratively defined as "waters of the U.S." and includes, with respect to the Colorado River, all tributaries of navigable waters up to their headwaters and landward to their ordinary high water marks, lakes, and adjacent wetlands. Section 404 waters are regulated for the placement of fill only.

The instrument of the Corps of Engineers authorization is a permit or letter of permission. The policies and procedures of the Corps of Engineers permit function is established in Title 33 CFR 320 through 330. A provision contained within these parts enables the Commander to issue a General Permit, such as that proposed for activities on the Colorado River, which are substantially similar in nature and will cause only minimal adverse environmental impacts when performed separately or result in a minimal adverse cumulative effect upon the environment. Upon issuance of a General Permit, all activities meeting the established criteria would be approved and will not require the issuance of Individual Permits. The regulations state that the General Permit may be revoked if it is determined that the cumulative effect of the activities authorized by it will have an adverse impact on the public interest. Following revocation, application for any future activities in areas covered by the General Permit would be processed as applications for Individual Permits.

#### Jurisdictional Boundaries

Both public and interagency confusion has been expressed in the past as to the District's jurisdictional or permit boundaries and area of influence. In essence, the District jurisdiction encompasses the resources riverward of the Ordinary High Water Mark and adjacent wetlands. Resources or development constraints landward of this mark are of concern only where they would be directly affected by a project under the District permit authority.

The geographical extent of the District's jurisdiction on the lower Colorado River is shown in Figure 1.

By Federal regulation, jurisdictional boundaries for permit authority on the Colorado River extend laterally to the entire water surface and bed of the river including all the land and waters below the Ordinary High Water Mark.

The Ordinary High Water Mark pertains to the line on the shore established by current fluctuations in the water level. Determinations of the Ordinary High Water Mark have in the past been accomplished through field checks by the District. Indications of the Ordinary High Water Mark include physical characteristics such as shelving of the bank, changes in the character of the soil, destruction of terrestrial vegetation or its inability to grow, the presence of litter and debris, or other visual characteristics that suggest the periodic elevation of the water line. Aside from actual in situ surveys, this determination has been attempted utilizing available water stage data to indicate the point on the shore that is inundated 25 percent of the time, as derived from a flow-duration curve. To date, the most effective means of determining the Ordinary High Water Mark has been field reconnaissance as water flow data changes from year to year due to climatological conditions and release rates from the several dams located along the river.

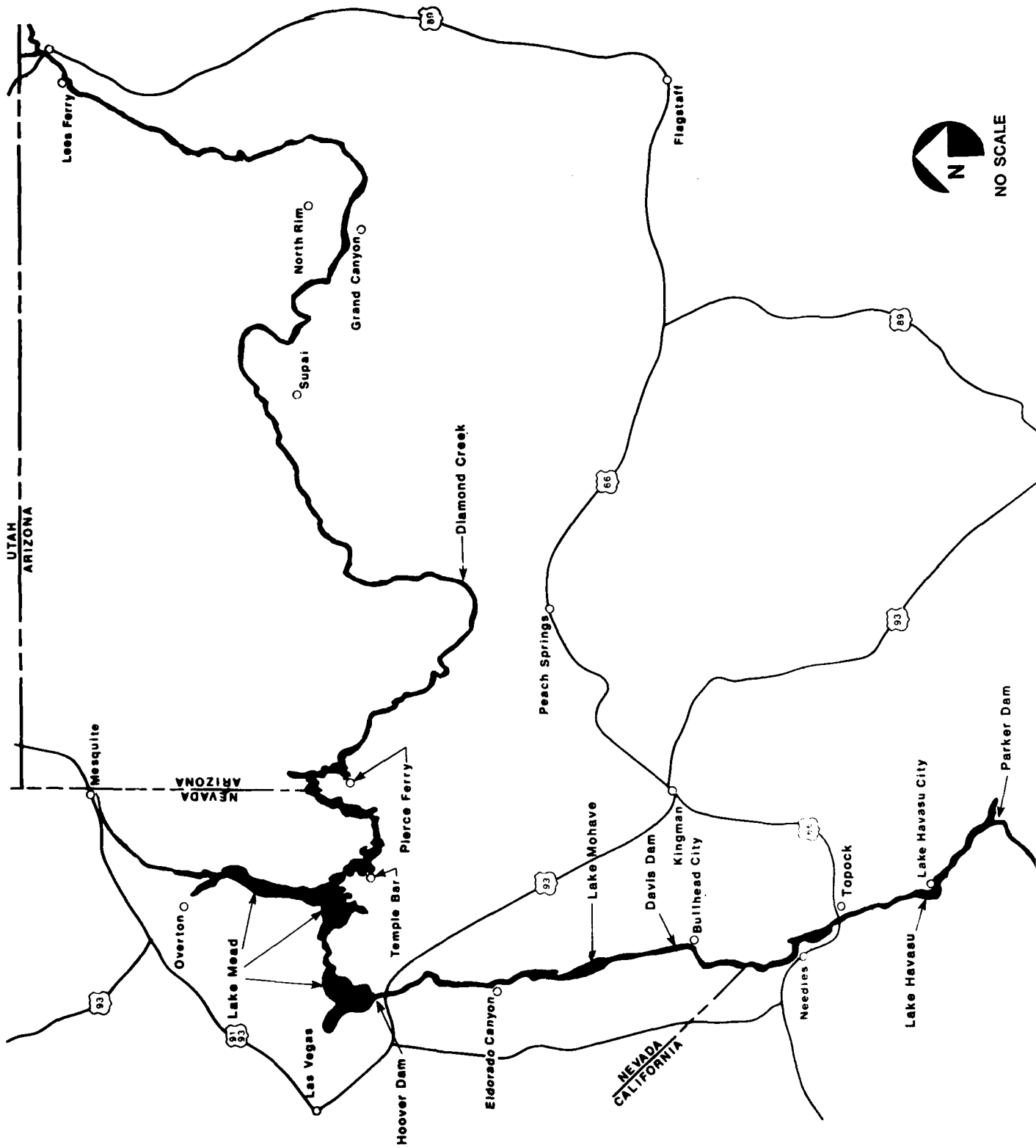
Also within the District's jurisdiction are the freshwater wetlands adjacent to the river. Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions (i.e., shallows, swamps, marshes and mudflats). Topock Marsh and Cibola Refuge, in addition to numerous linear marshes and other wetlands lining the Colorado River channel, are under the District's jurisdiction.

#### Existing Permit Procedures and Problems

The permit procedures currently in effect along the river for the various types of structures or works regulated by the District involves an application for, and evaluation of, an Individual Permit. This type of permit is an authorization issued following a case by case evaluation of a specific structure within the District jurisdiction. This process is initiated upon receipt of an application to the Commander in Los Angeles. The application must include a complete description of the proposed activity including necessary sketches or plans; the location, purpose, and intended use of the proposed structure; the location and dimensions of adjacent structures; and documentation of any other approvals or denials of the project as required by other Federal, state, or local agencies.

As the District's jurisdictional boundaries are very narrowly defined and culminate at the Ordinary High Water Mark, a question may arise at times as to whether the proposed project is actually in their jurisdiction. Boat docks would almost without exception be within the District's jurisdiction; however, bulkheads and sand beaches may not. Jurisdiction is determined by the L.A. District's Regulatory Functions Branch, based either on information supplied in the application or, if necessary, by conducting a field check.

When all required information has been provided, the Commander will issue a public notice advising all interested parties of the proposed activity and soliciting comments and concerns to evaluate the probable impact on the public interest. Comment period on the public notice is normally 30 days.





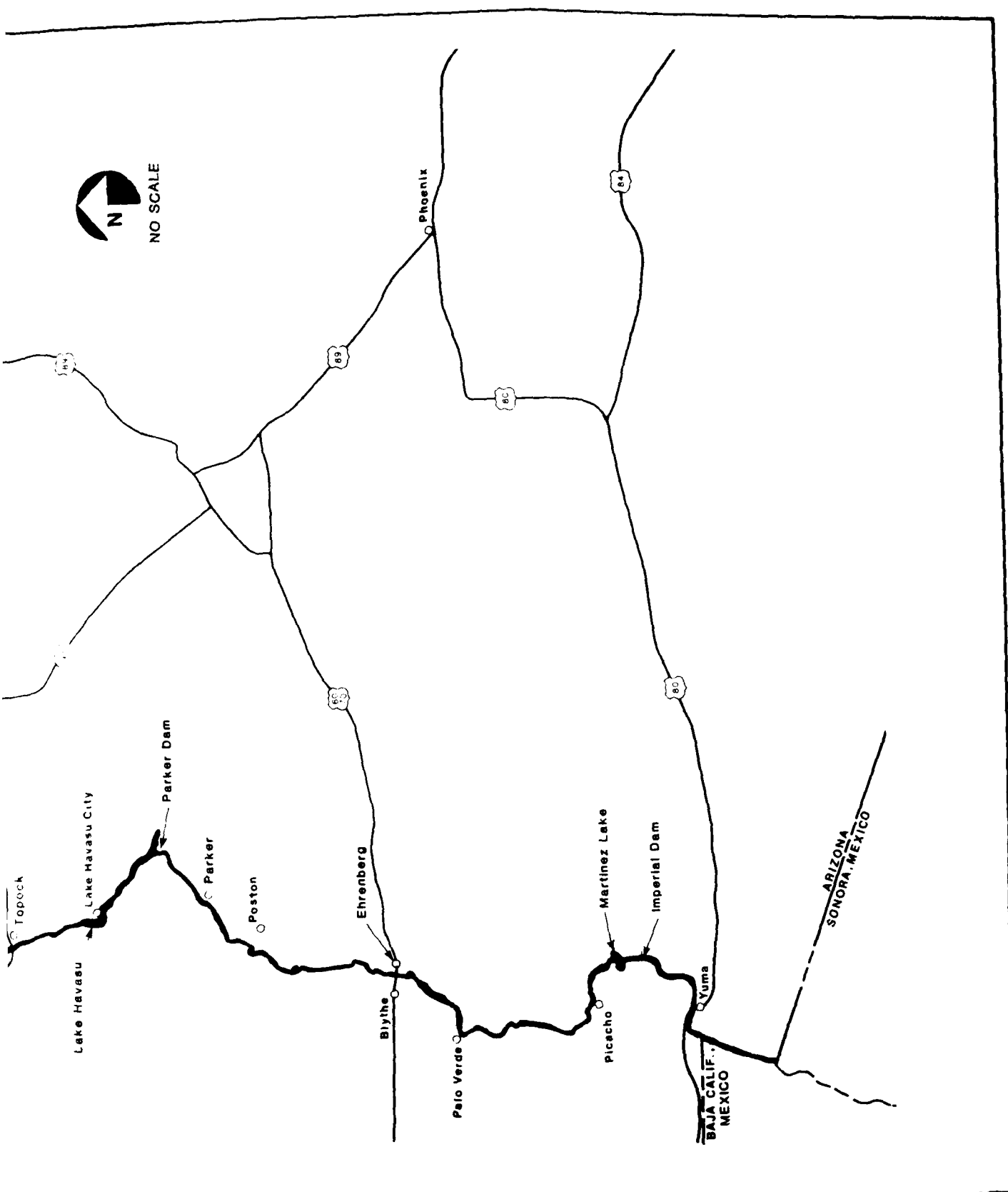


Figure 1. Los Angeles District jurisdictional area.

The decision whether to issue a permit is based on an evaluation of the probable impact of the proposed structure or work and its intended use on the public interest. The public interest refers to the needs and welfare of the local populace as well as the national concern for both protection and utilization of important resources. The District's permit regulations further state that no permit will be granted unless the issuance is found to be in the public interest.

In determining the public interest, the following general criteria are considered in the evaluation of every permit application:

1. The relative extent of the public and private need for the proposed structure or work;
2. The desirability of using appropriate alternative locations and methods to accomplish the objective of the proposed structure or work;
3. The extent and permanence of the beneficial and detrimental effects that the proposed structure or work may have on the public and private uses to which the area is suited;
4. The probable impact of each proposal in relation to the cumulative effect created by other existing or anticipated structures in the general area;
5. Where officially adopted state, regional, or local land use classifications, determinations, or policies are applicable to the land or water areas under consideration, they shall be presumed to reflect local factors of the public interest; and
6. In the case of construction occurring in a wetland, whether the proposed activity is primarily dependent on being located in or in close proximity to the aquatic environment and whether feasible alternative sites are available.

Processing of an application for a District permit normally proceeds concurrently with the processing of other required federal, state and/or local authorizations. Due consideration is given to comments from those agencies having jurisdiction or interest over the proposed activity, including those with no discretionary authority. Permits will not normally be issued over the objections of a state agency, provided it is the position of the Governor. By the same measure, if a state or local agency issues a permit, the District would not deny its permit unless there are overriding national factors of the public interest which dictate such action. The coordination with other agencies serves to provide a more precise definition of those factors in the public interest as they apply to the Colorado River's natural and recreational resources.

Following coordination with state and local agencies, the Commander will process the application to its completion, either approving the application as submitted, approving with conditions, or denying the requested use. It is the

District's policy that in the absence of overriding public interest, favorable consideration will generally be given to applications from riparian owners for permits for piers, boat docks, moorings, platforms, and similar structures for small boats. If the proposed project is considered to be minor (i.e., placement of a marker buoy, or work requiring modification of an existing permit), has no significant impact on environmental values, and encounters no opposition, the Commander may omit the public notice and authorize the work by a Letter of Permission, but only for those activities requiring a permit under Section 10 of the River and Harbor Act. Such action will be in coordination with all concerned fish and wildlife agencies. The granting of a letter of permission or the Individual Permit will include any modifications or conditions imposed upon the application as determined necessary by the District to protect the public interest.

#### Coordination with Other Governmental Entities

As no single agency possesses the authority or resources to manage, plan, or regulate all aspects of the Colorado River environment, a high degree of coordination must exist among the responsible government entities. Therefore, in formulating the General Permit, the District has adopted a multidisciplinary approach to ensure that permits are responsive to the many and sometimes conflicting public interests and policies involved in the construction of the shoreside structures as defined in the General Permit.

Numerous state and federal agencies and tribal governments are affected by the General Permit insofar as the boundaries, purposes, and stipulations of the proposed permit touch upon these entities' respective jurisdictions and authorities. The following discussion summarizes the spectrum of governmental entities vested with regulatory or management authority over some aspect of activities on the Colorado River and what their general concerns are with regard to the district regulatory function. It may be evident to the reader that there exists an overlap of jurisdictions, thus creating confusion to the public in the past as to the responsibilities of each respective agency.

U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR. Under the provisions of the Fish and Wildlife Coordination Act, the U.S. Fish and Wildlife Service (FWS) is granted coordination responsibilities for permit applications submitted to the District. The FWS evaluates permit applications with regard to potential impacts on fish and wildlife resources, and with special attention to the protection of migrating waterfowl and endangered or threatened species. The FWS may also make recommendations concerning permit conditions, or may object to the permit entirely and cause the permit to be delayed or denied. The FWS is also responsible for managing the several National Wildlife Refuges that border the Colorado River.

BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR. The Bureau of Land Management (BLM) has jurisdiction over federal lands adjacent to the river, terminating at the ordinary high water mark. The BLM also has joint-jurisdiction with the Bureau of Reclamation on lands withdrawn for reclamation purposes. The BLM's regulatory authority is limited to activities occurring on BLM land primarily related to recreational use and habitat management; however, the department may also comment on District permit applications in conjunction with other Department of Interior branches.

BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR. The jurisdictional boundaries of the Bureau of Reclamation (BR) extends through the entire river system including dams, levees, bank line structures and easements, and adjacent public lands withdrawn for reclamation. The primary responsibilities of the BR entail the regulation of water allocation for flood control, irrigation uses and power production, operation and management of the water system for navigation and recreation, and rectification and control of the channels. The BR must obtain permits from the District for reclamation or diversion work or notify the District of flood control operations. The BR also reviews and comments on District permit applications.

BUREAU OF INDIAN AFFAIRS, DEPARTMENT OF THE INTERIOR. The Bureau of Indian Affairs (BIA) jurisdiction and primary interest is confined to the Native American lands. However, the BIA may comment on all District permit applications along the Colorado River regardless of whether Native American lands are involved.

NATIONAL PARK SERVICE. The National Park Service (NPS) has jurisdiction over the Lake Mead National Recreation Area and Grand Canyon National Park, commencing directly south of Lee's Ferry and extending downstream to Davis Dam. The NPS is responsible for total management of the designated parks including discretionary land use actions and law enforcement. The NPS has patrol boats on the lakes and enforces all applicable federal laws and regulations. The Park Service's interface with the District primarily occurs when a concessionaire desires to make waterfront improvements on a leasehold which may require permit approval from the District.

U.S. COAST GUARD. The U.S. Coast Guard formerly maintained an office on the Colorado River near Parker Dam. The Coast Guard enforced boating and navigation regulations principally along the Parker Strip. The Coast Guard recently closed their Colorado River division, turning over their patrolling function to fish and game agencies of California and Arizona. At present, there are no plans to reopen this office; however, the Coast Guard has retained review responsibilities for District permits.

CALIFORNIA STATE LANDS COMMISSION. The California State Lands Commission (CSLC) has jurisdiction over the Colorado riverbed from the Ordinary High Water Mark riverward to the center of the river. Jurisdiction on state sovereign lands also extends to the Ordinary Low Water Mark if fee ownership exists and to the Ordinary High Water Mark if public trust lands are involved. The main concern of the CSLC is to maintain the natural condition of undeveloped areas. Permitting activities include the authorization of piers and electric or gas line installations across the natural bed of the river, and agency review of District permits. CSLC approval is required prior to issuance of a permit.

ARIZONA LANDS DEPARTMENT. The Arizona Lands Department (ALD) has jurisdiction for the Arizona side of the riverbed to the Ordinary High Water Mark; however, unlike California, this authority extends throughout the length of the river encompassing developed as well as natural areas. The ALD issues special-use permits to applicants for boat docks anchored into the bank of the riverbed and controls overhead or underground rights-of-way. The regulation

of activities within the river is similar the District regulation, although the emphasis of the ALD is on whether the project will alter the contours of the river bottom. The ALD also reviews District permit applications.

NEVADA DIVISION OF STATE LANDS, DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES. The Nevada Division of State Lands (NDSL) has jurisdiction for the Nevada portion of the Colorado River, from the Ordinary High Water Mark riverward to the state line. NDSL issues special-use permits for boat docks and other activities.

CALIFORNIA DEPARTMENT OF FISH AND GAME. The jurisdiction of the California Department of Fish and Game (CDFG) extends from the river bank to the state line, normally the center of the river. The CDFG is responsible for managing wildlife resources along the California portion of the river, and conducts both a permit and patrol function to accomplish this responsibility. The CDFG does not have title to lands along the river but is responsible for the regulation of riverbed alterations through its own permit process. The CDFG is responsible for detecting riverbed alterations and may notify the District in the event of alteration or unauthorized construction of structures. The CDFG also reviews District permits.

ARIZONA GAME AND FISH DEPARTMENT. The Arizona Game and Fish Department (AGFD) is responsible for the management of wildlife resources along the Arizona portion of the river, normally determined as the center of the river landward. The AGFD has concurrent jurisdiction with the U.S. Fish and Wildlife Service and the U.S. Coast Guard over certain activities including the enforcement of wildlife statutes, citations for watercraft violations, and placement of aids to navigation in state waters. In essence, the AGFD functions as a patrol and licensing agency and is not vested with permit authority. However, the AGFD also reviews District permits falling within their area of interest.

NEVADA DEPARTMENT OF WILDLIFE. The Nevada Department of Wildlife (NDW) regulates fishing and boating activities along the Nevada portion of the river. As the majority of the Colorado River bordering Nevada is designated as National Park lands, the NDW has jurisdiction over all resident wildlife in cooperation with the National Park Service. The NDW also reviews District permit actions to provide input as to the potential impacts upon fisheries and wildlife.

LOCAL GOVERNING ENTITIES. The policies and plans of city, county, and tribal governments bordering the river control local shoreline uses and indirectly influence the type and magnitude of permit applications for waterfront improvements such as boat docks and beaches. The local entities' authority is usually limited to activities occurring onshore; however, county sheriffs may also have patrol boats on the river.

The existing policies, management plans, and concerns of the aforementioned governmental entities have been considered to the extent that they are available in the formulation of the proposed General Permit in order to achieve consistency among the goals of the various agencies having jurisdiction over the Colorado River.

#### Problems With Current Permit Procedures

The current procedures for evaluation of Individual Permits, as outlined above, have proven inefficient as well as inadequate in the estimation of cumulative impacts. Delays in the processing of permits have occurred both on the part of the District and that of the applicant. The volume of applications processed annually along the Colorado River has exceeded the capacity of the District to respond quickly and efficiently at present staffing levels. The manner in which each application is processed on an individual basis, despite similarities in actions and their impacts, is redundant and results in unnecessary delays. The current procedure does not allow for adequate evaluation of cumulative impacts.

### 3. OBJECTIVES OF THE PROPOSED ACTION

The proposed General Permit is designed to alleviate processing delays and to minimize cumulative losses from future District-permitted development. These are two areas of concern under the present practice of considering each application under the Individual Permit process.

Issuance of a General Permit constitutes immediate approval of specific actions within designated areas, thereby eliminating the need for an individual application and case-by-case review. This form of general authorization is of benefit time-wise both to the District and the applicant. Economies in processing-time brought about by the elimination of individual field surveys, environmental assessments, and the requirement for 30-day public notice are passed on to the applicant in the form of prompt (30-day) authorization.

Proposed General Permit areas were delineated on the basis of calculated resource-sensitivity/impact relationships over the entire river, in which cumulative effects of shoreline developments were considered. The resulting General Permit provides for mitigation of potential cumulative impacts by permitting a uniform configuration of structures expected to minimize adverse development impacts on the river environment.

#### 4. FORMULATION OF THE GENERAL PERMIT

The General Permit was developed in two phases. Phase 1 consisted of the compilation of a data base establishing pertinent environmental parameters and inventorying resources. This was intended to serve as a partial basis for evaluation of resources under Phase 2, ultimately leading to delineation of the General Permit areas.

The result of Phase 1 investigations was a document entitled "Preliminary Environmental Resources Inventory Report (PERIR), Vols. I and II", dated June 1981. The document is on file at the L.A. District Office, U.S. Army Corps of Engineers, and is available upon request. The report compiled published and unpublished information relating to environmental resources of that portion of the Colorado River under the jurisdiction of the L.A. District. The environmental parameters considered were as follows:

- Water quality and aquatic biology
- Terrestrial biology
- Air quality
- Cultural resources
- Land use
- Population
- Public safety
- Noise
- Recreation

Phase 2 of the permit formulation began with the expansion and revision of data compiled in Phase 1, in part through field checks. From this point General Permit formulation proceeded in three stages

##### ANALYSIS OF GENERIC IMPACTS OF PERMITTED STRUCTURES

In order to facilitate estimation of cumulative impacts, an analysis of environmental impacts of isolated and cumulative construction of bulkhead walls, riprap slopes, sand beaches and boat docks was conducted. A summary of these analyses is contained in Appendix A.

##### DEVELOPING CUMULATIVE SENSITIVITIES BY COMPARING IMPACT EFFECTS WITH RESOURCE SENSITIVITIES AT IMPACT LOCATIONS.

Utilizing resource data available from Phase 1 research and cumulative impact analysis, sensitivity ratings were assigned to resource and environmental parameters over the entire Phase 1 study area (L.A. District jurisdictional area). Ratings of maximum, major, moderate, and minor were assigned to denote the sensitivity of a resource or the compatibility of a use-factor (e.g. land use or recreation) to potential maximum development under the General Permit. Sensitivity ratings were displayed in a series of maps covering the Lower Colorado River, each set illustrating sensitivities of a given environmental parameter as defined in Phase 1. The individual maps were then consolidated into two series, one depicting biological and water quality sensitivities, and a second showing cultural sensitivities (recreation, public safety, land use and cultural resources). These maps



represent a synthesis of information on the existing conditions of the study area, and an estimation of the cumulative effects resulting from the approval of a large number of district-permitted activities.

#### FORMULATION OF PERMIT CRITERIA AND MATRIX

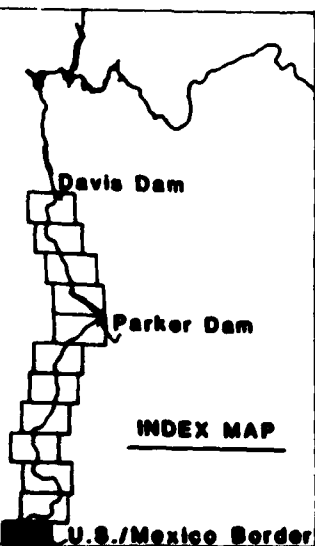
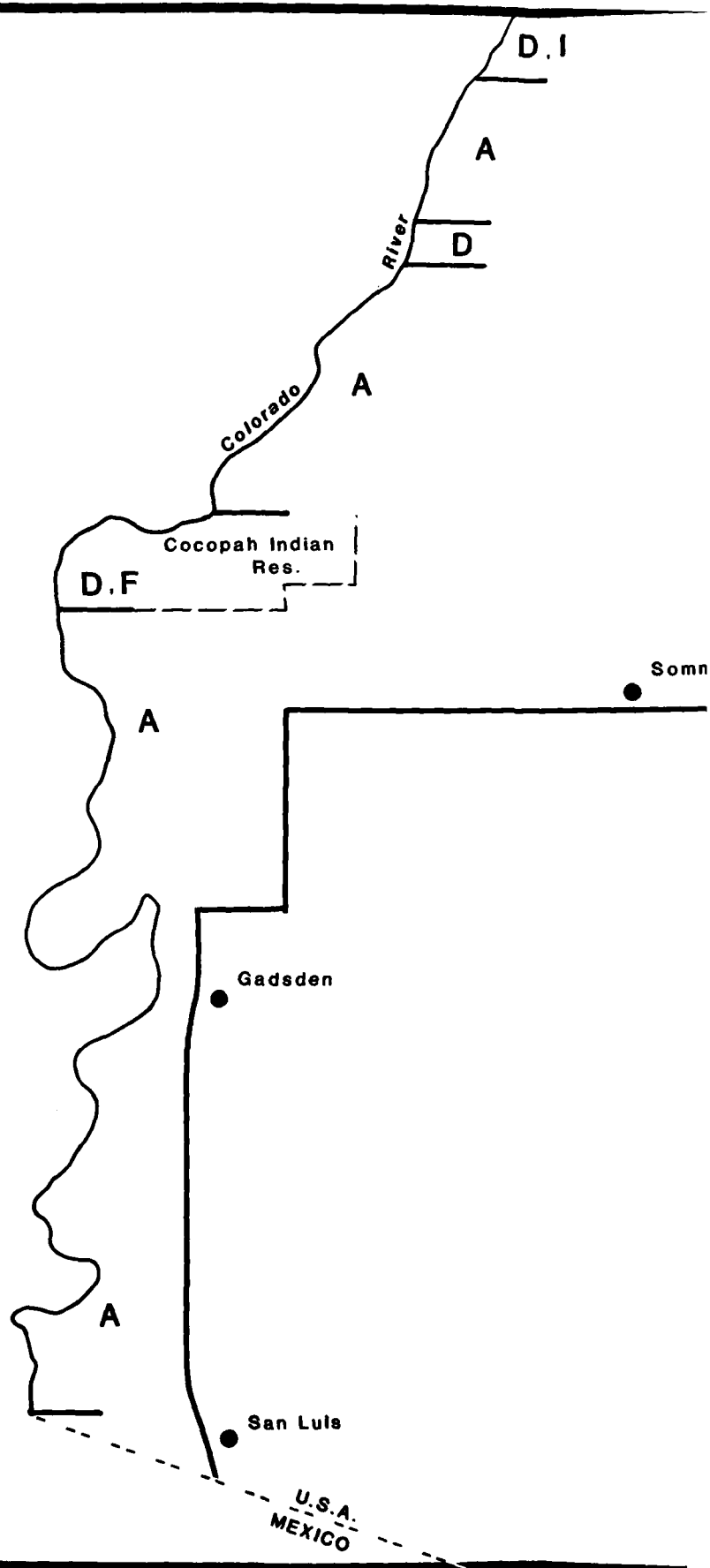
On the basis of the sensitivity maps and known development constraints, a set of permit criteria were developed for each environmental parameter considered. The permit criteria and sensitivity maps were then integrated to produce a matrix displaying, by river mile for the entire Lower Colorado River, the constraints to issuance of a General Permit as dictated by Permit Criteria and based upon sensitivity ratings. This matrix served to identify potential areas where a General Permit would be acceptable.

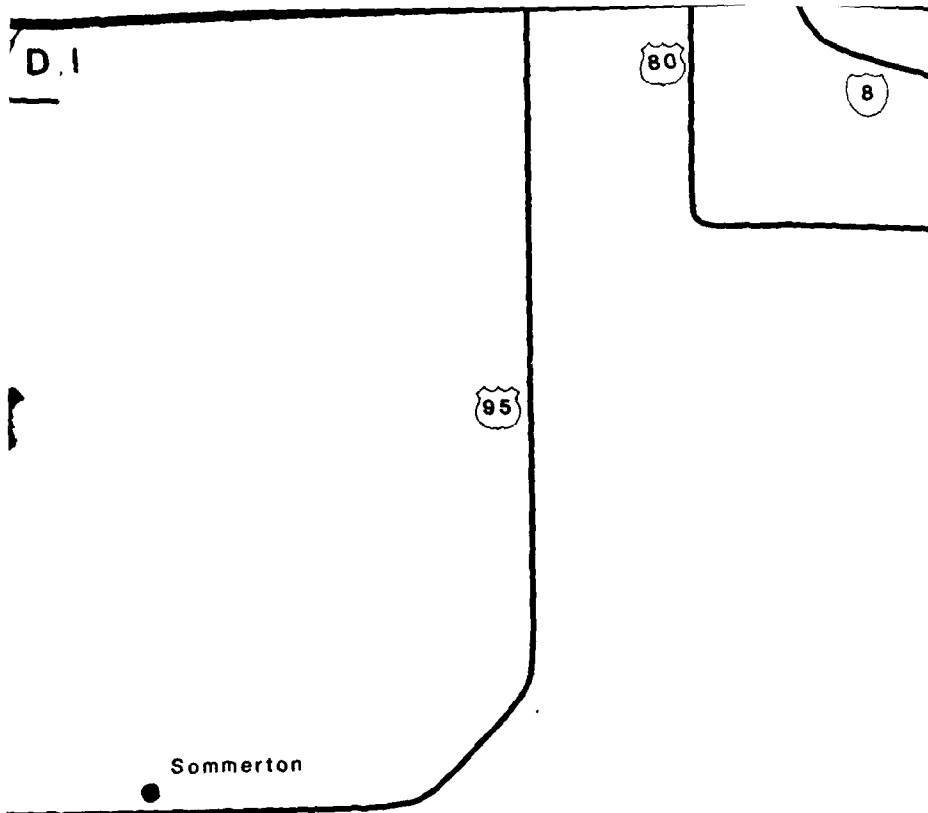
The Sensitivity maps, Permit Criteria, and Matrix have been published in a document entitled "Lower Colorado River Resource Sensitivities and Permit Criteria Report", dated October 1981. The report is on file at the L.A. District Office, U.S. Army Corps of Engineers.

The following map series (Plate 1; Sheets 1 to 12), provides a generalized and simplified illustration of environmental "constraints" in non-permit areas. The sensitive resources and environmental criteria depicted in the maps governed the selection of general permit areas. It should be noted however, that the sensitivity maps and permit criteria developed in stages 2 and 3 above were based on cumulative impact/sensitivity relationships. As such, the following maps do not contain a complete summary of the information which contributed to the selection of the General Permit areas.

**MEXICO**

**Baja California**





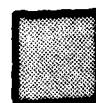
ARIZONA

Yuma County



# CONSTRAINTS

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- I - Within 1/2 mile of a dam
- J - State ownership (land use constraint)



GENERAL PERMIT AREA

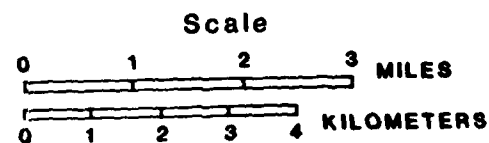
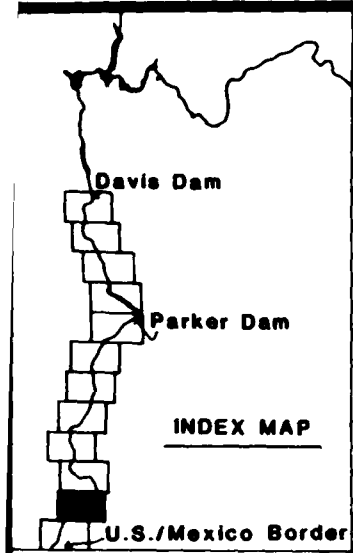


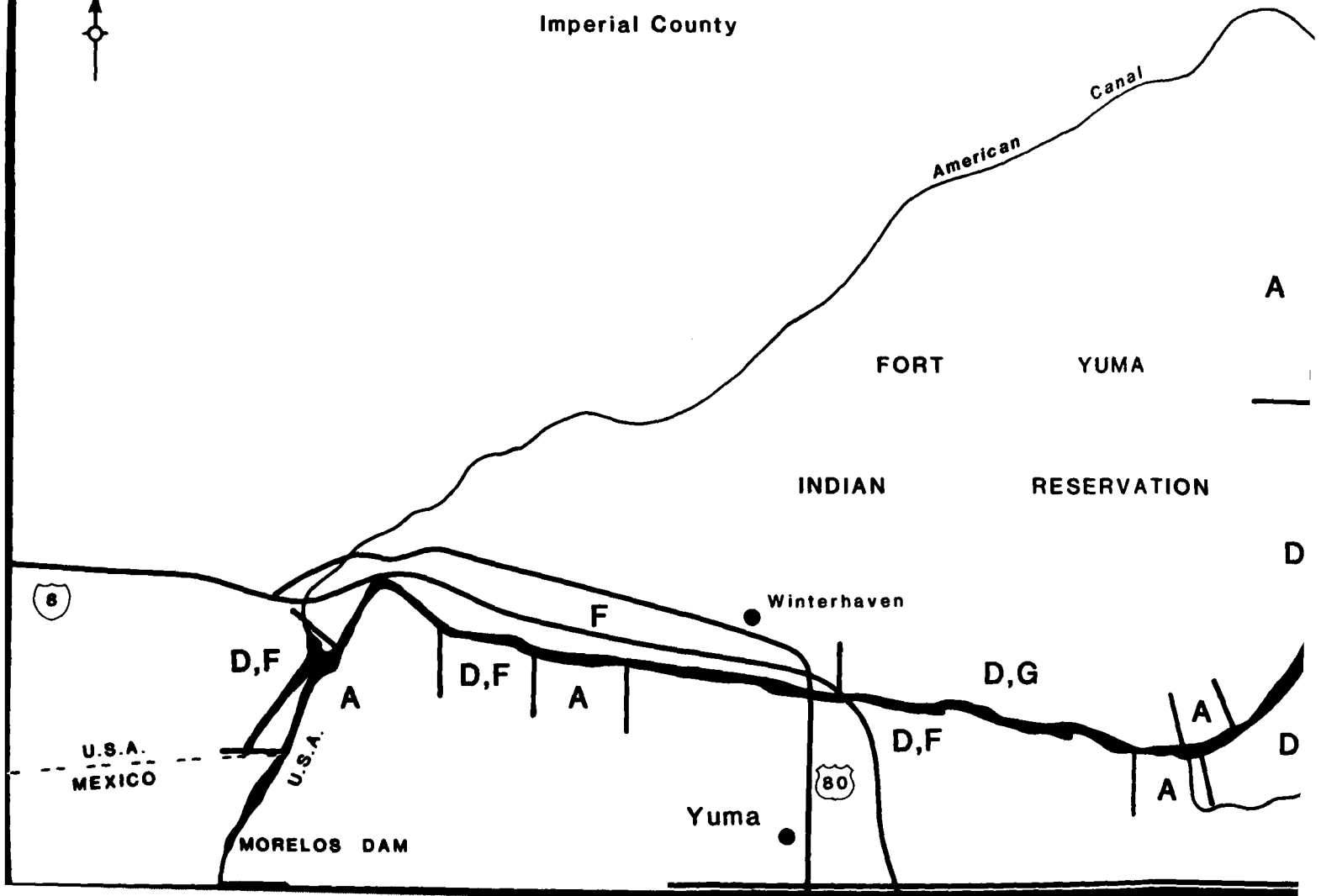
PLATE 1 SHEET 1 of 12

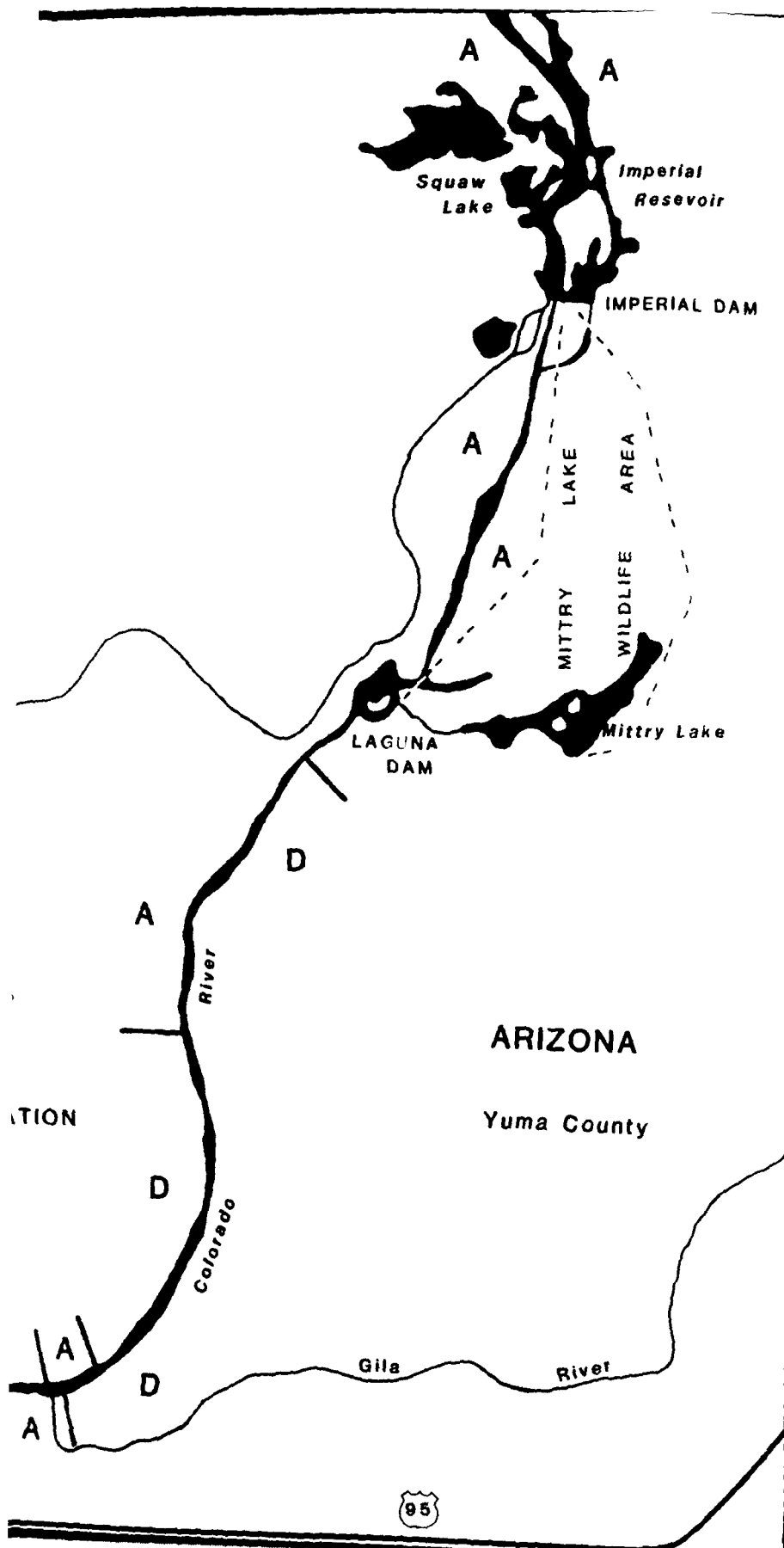
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS



# CALIFORNIA

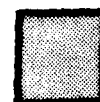
Imperial County





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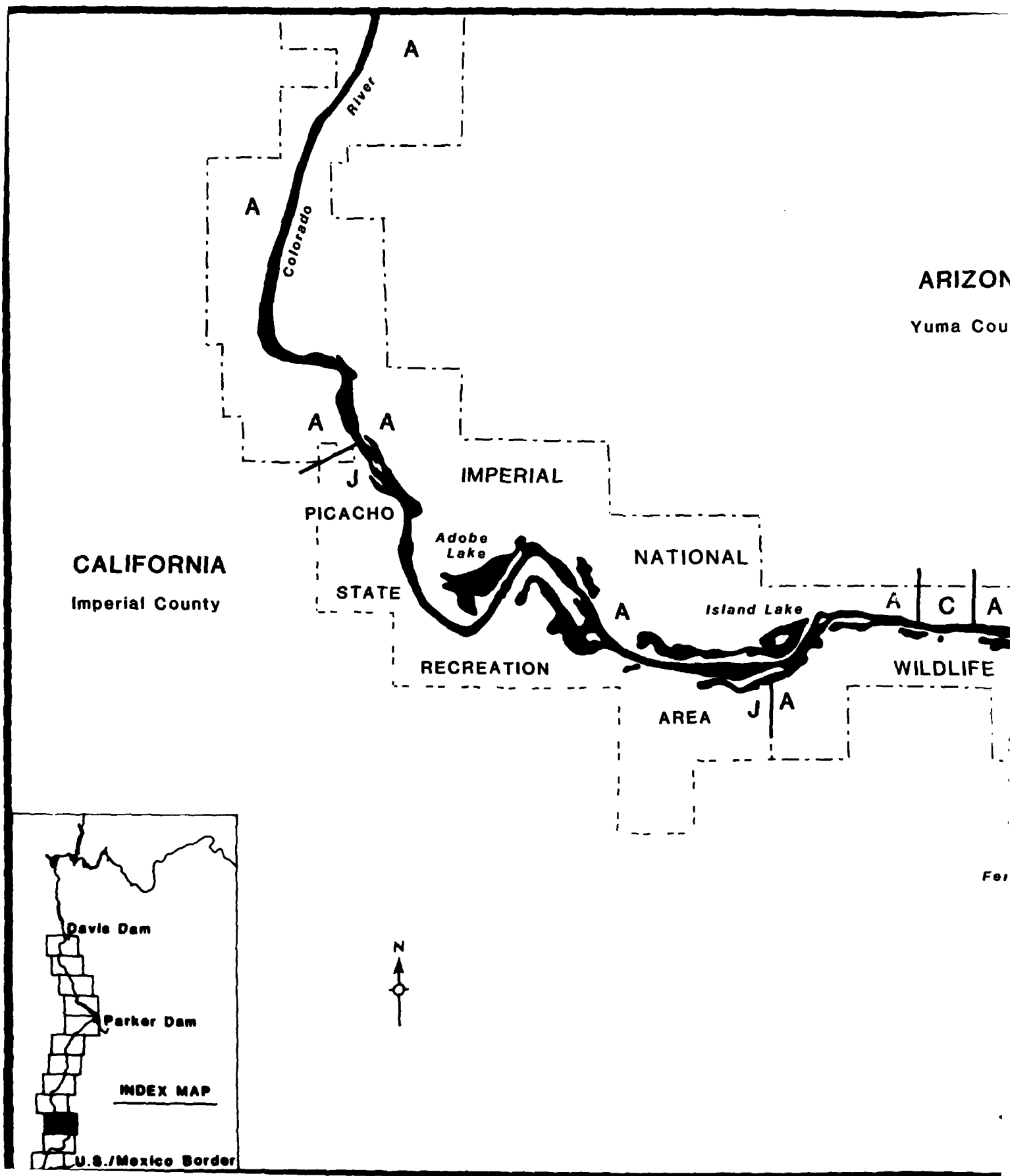


GENERAL PERMIT AREA

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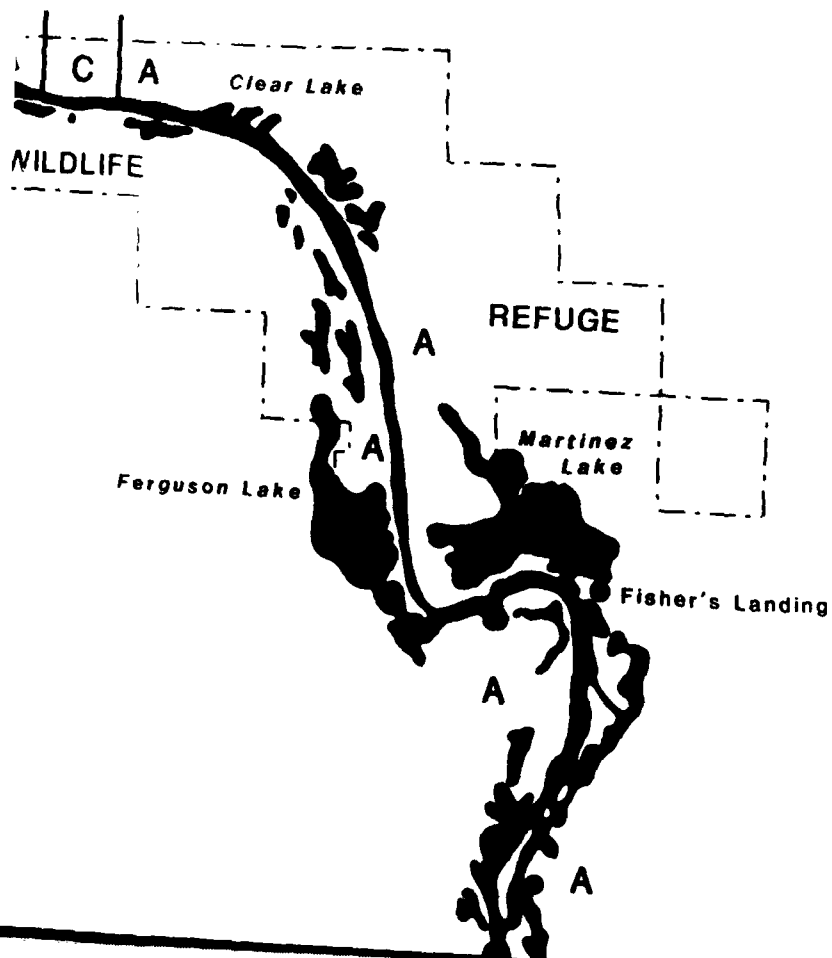


PLATE 1 SHEET 2 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS



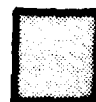
# ARIZONA

Yuma County



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GENERAL PERMIT AREA

Scale

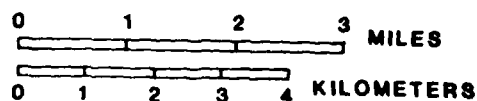
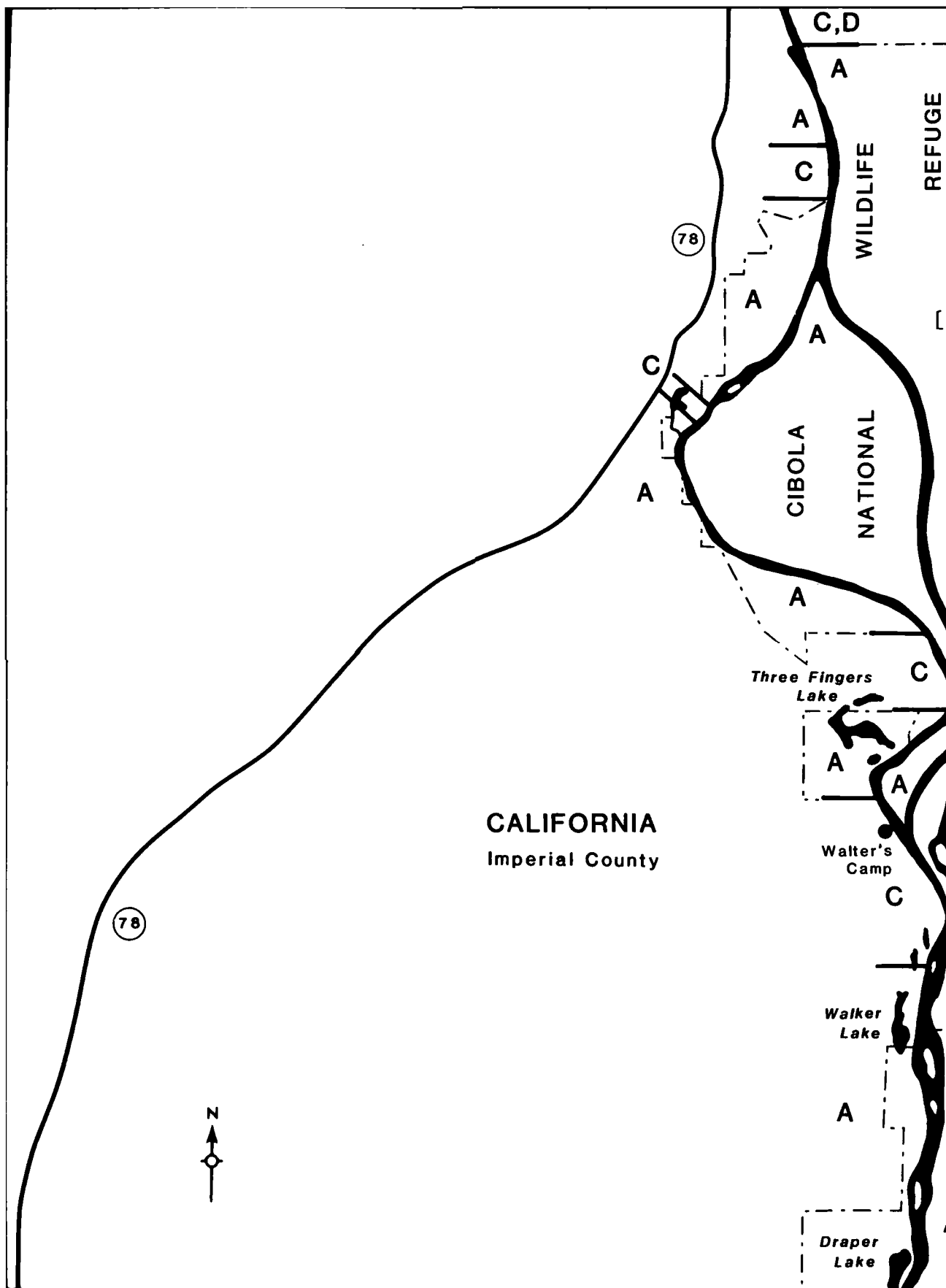


PLATE 1 SHEET 3 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS





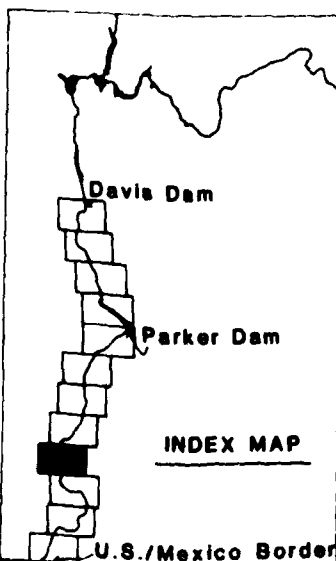
# ARIZONA

Yuma County

Cibola

Cibola Lake

IMPERIAL  
NATIONAL  
WILDLIFE REFUGE



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GENERAL PERMIT AREA

Scale

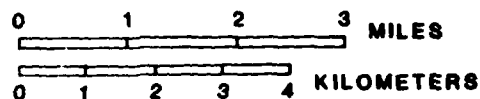
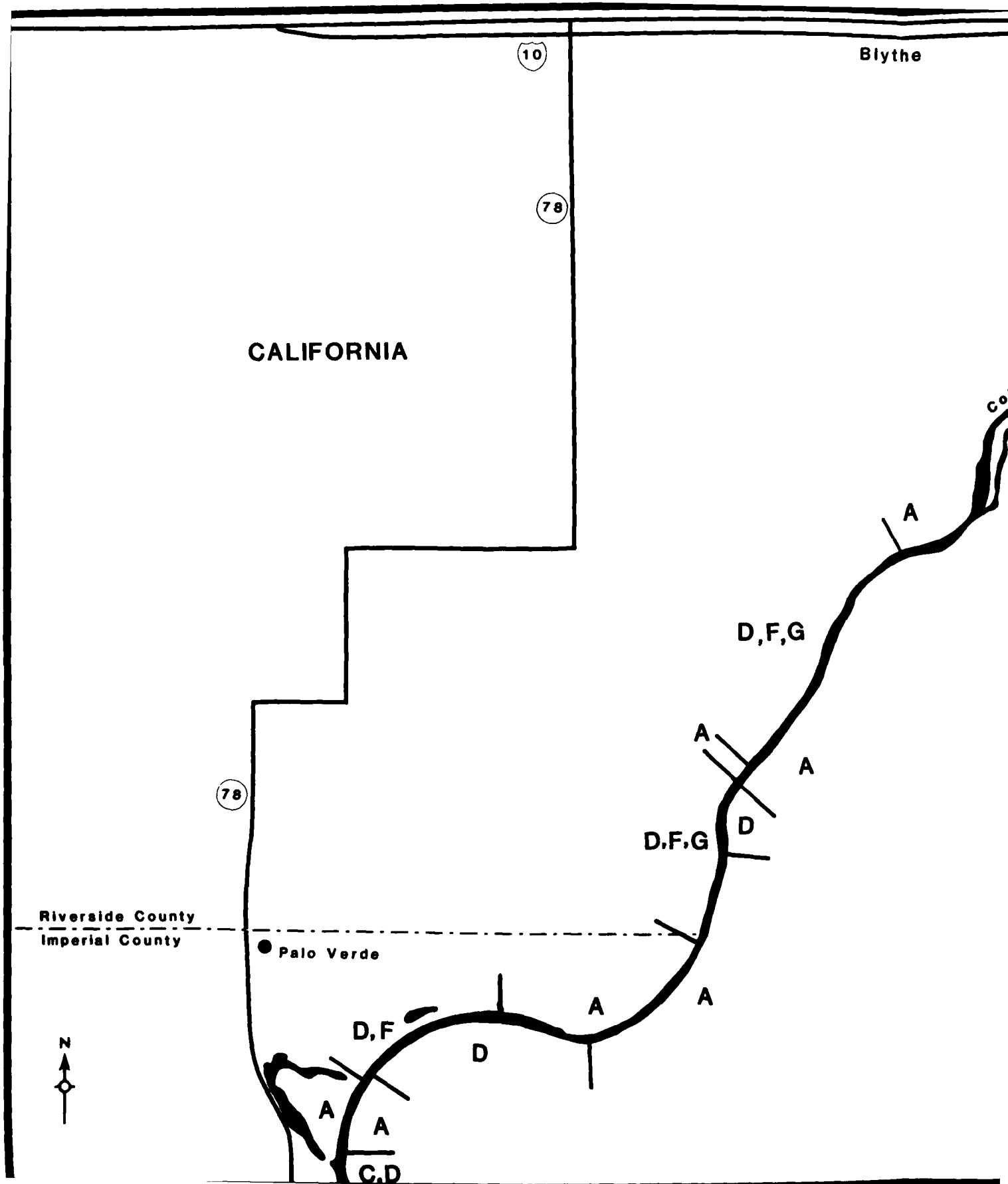
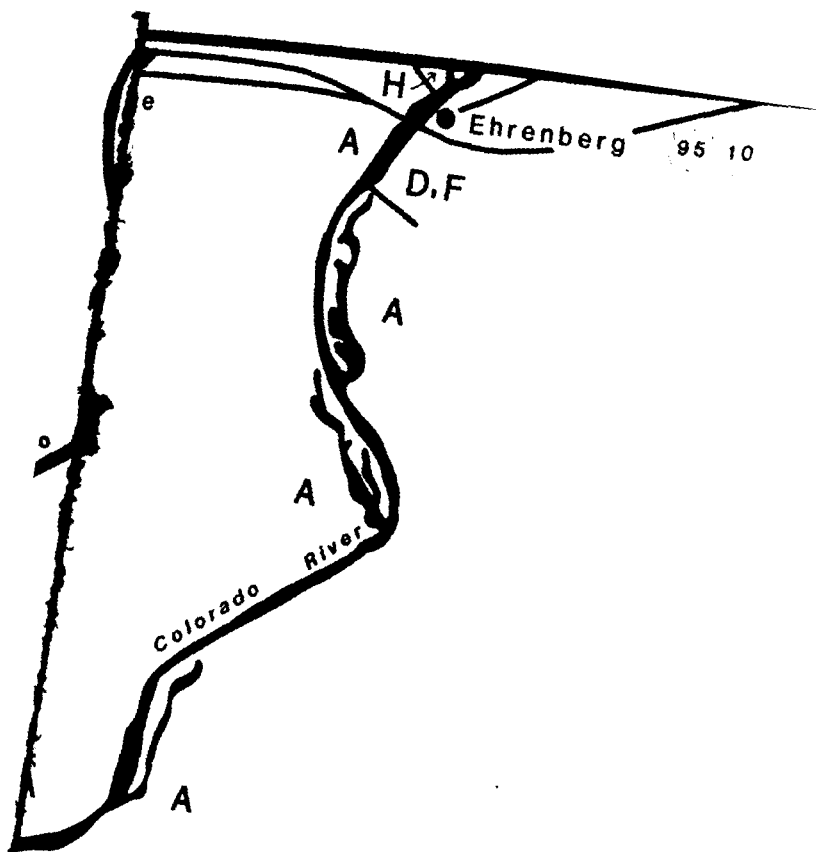
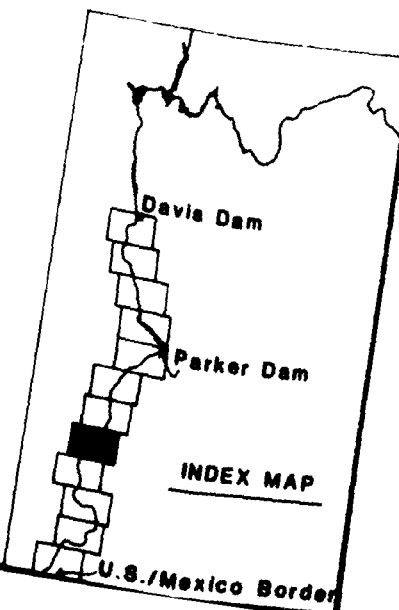


PLATE 1 SHEET 4 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS



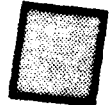


ARIZONA  
Yuma County



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GENERAL PERMIT AREA

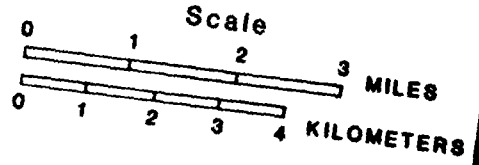
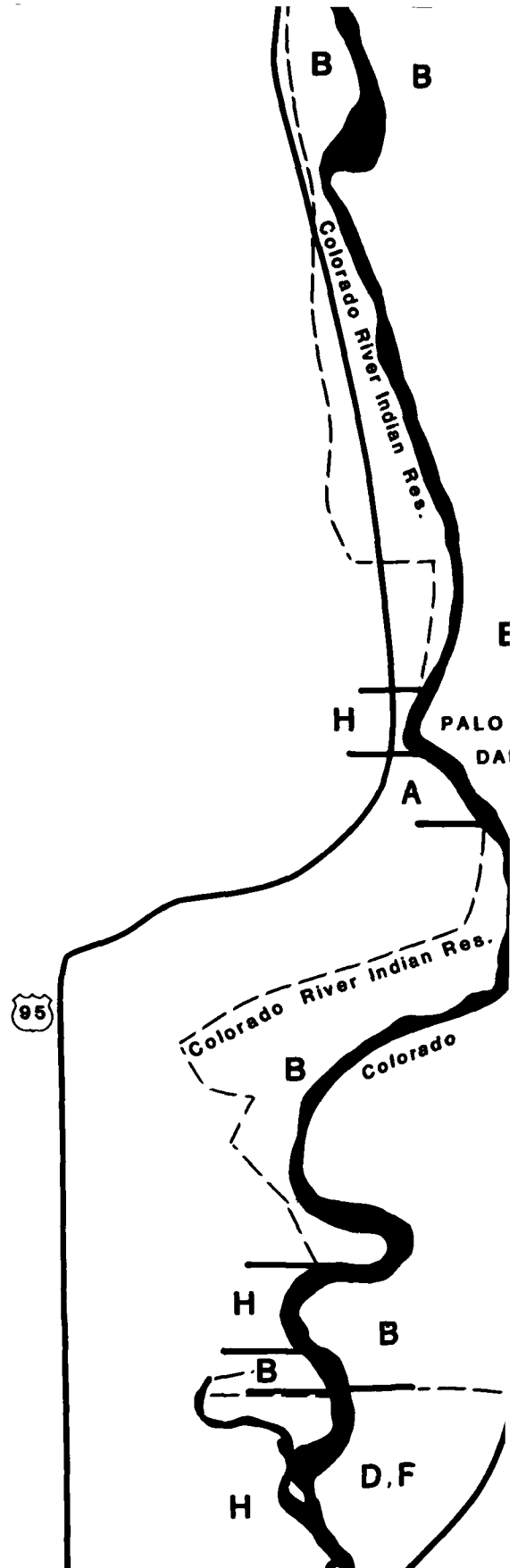
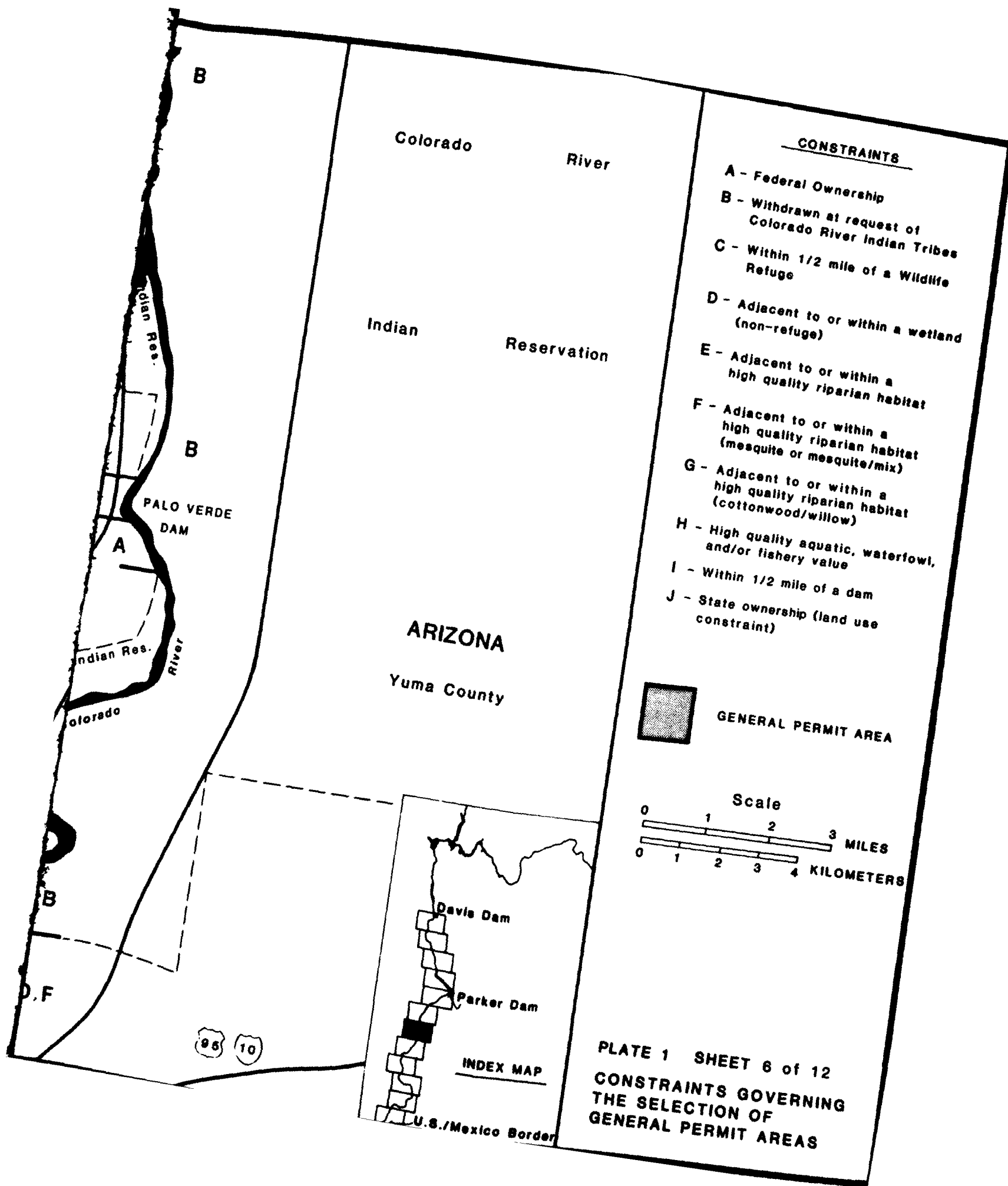


PLATE 1 SHEET 5 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS

**CALIFORNIA**

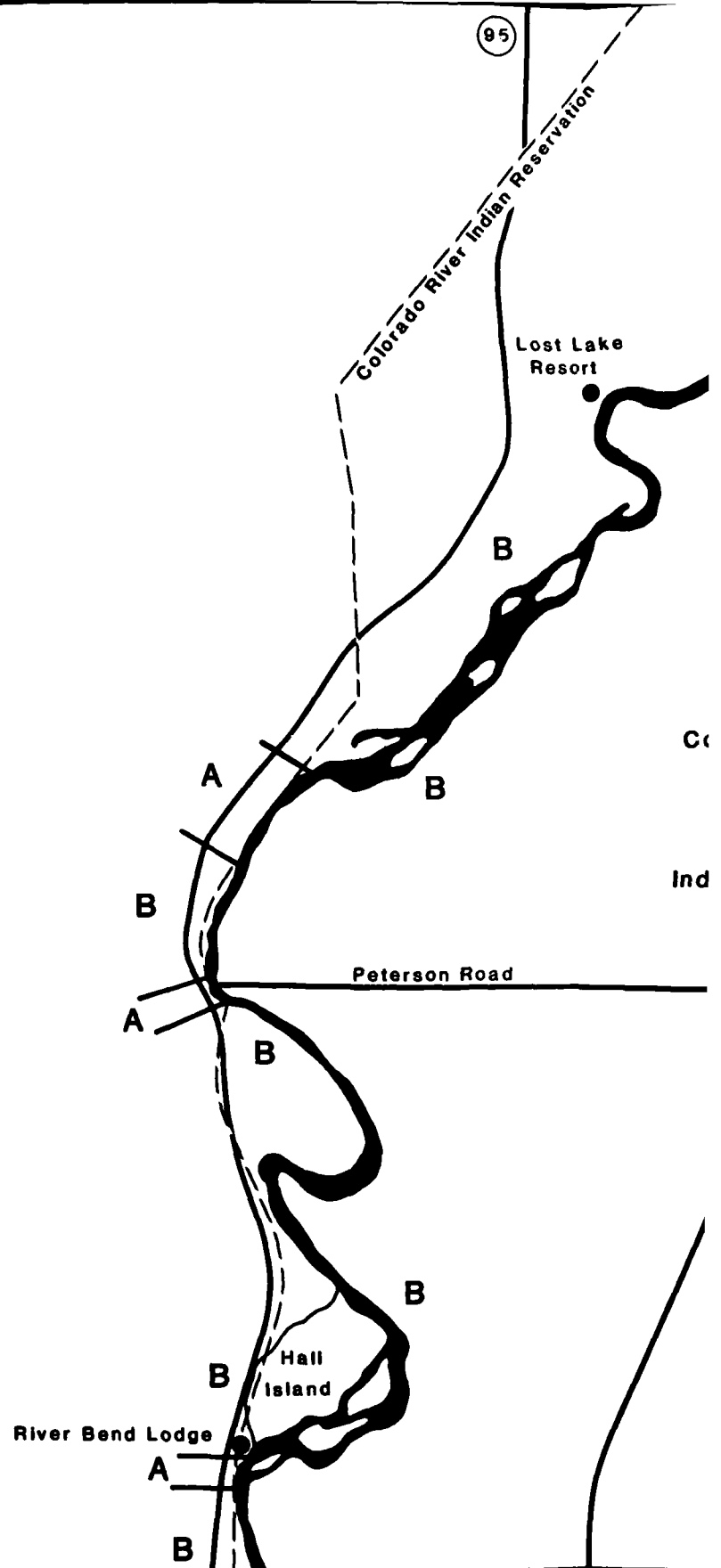
**Riverside County**

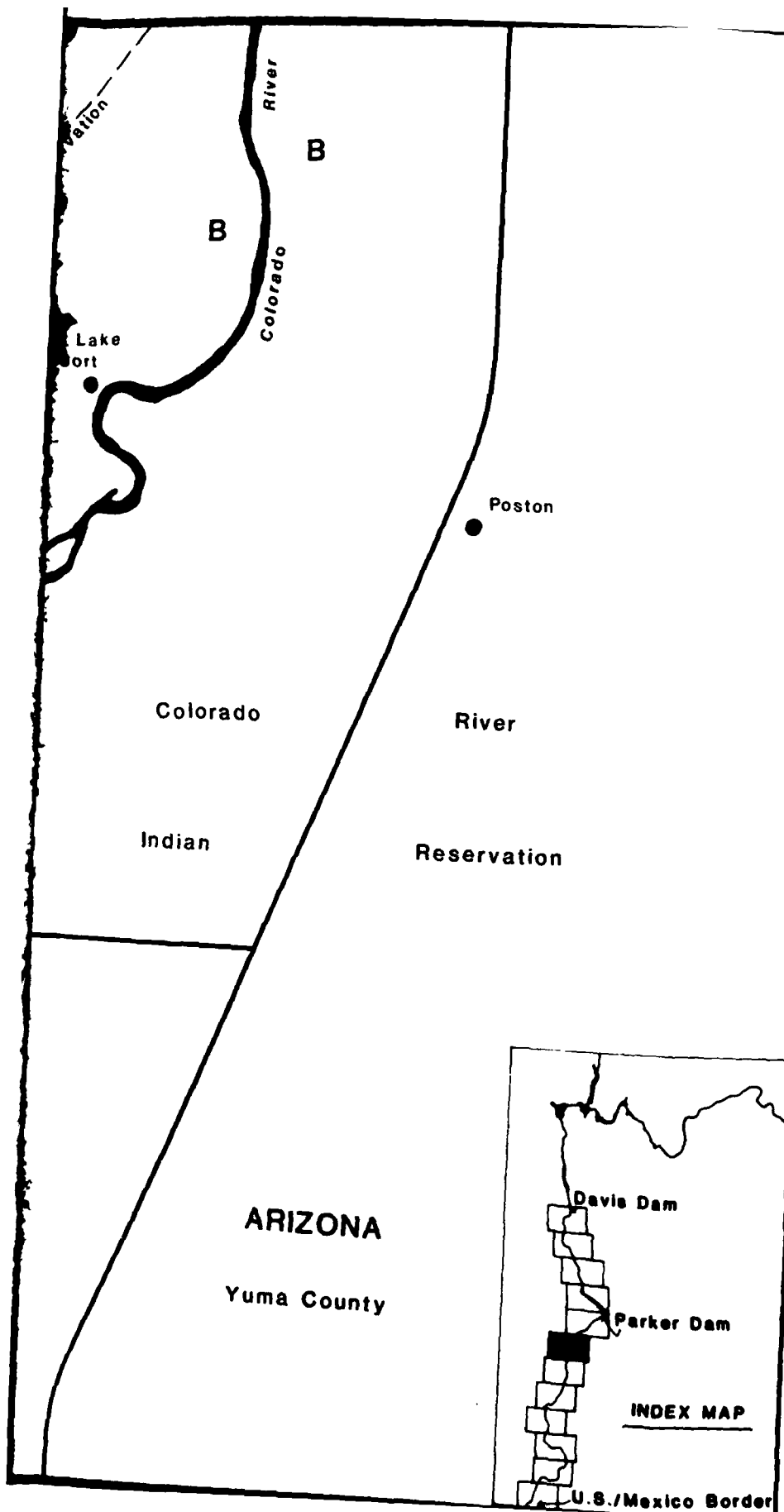




CALIFORNIA

Riverside County





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GENERAL PERMIT AREA

Scale

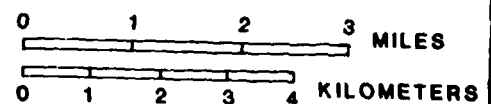


PLATE 1 SHEET 7 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS

CALIFORNIA

San Bernardino County

Colorado River Indian Reservation

Cross Roads

HEADGATE  
ROCK DAM

Lake Moovalya

Earp

Parker

Big River

Deer Island

Colorado

River

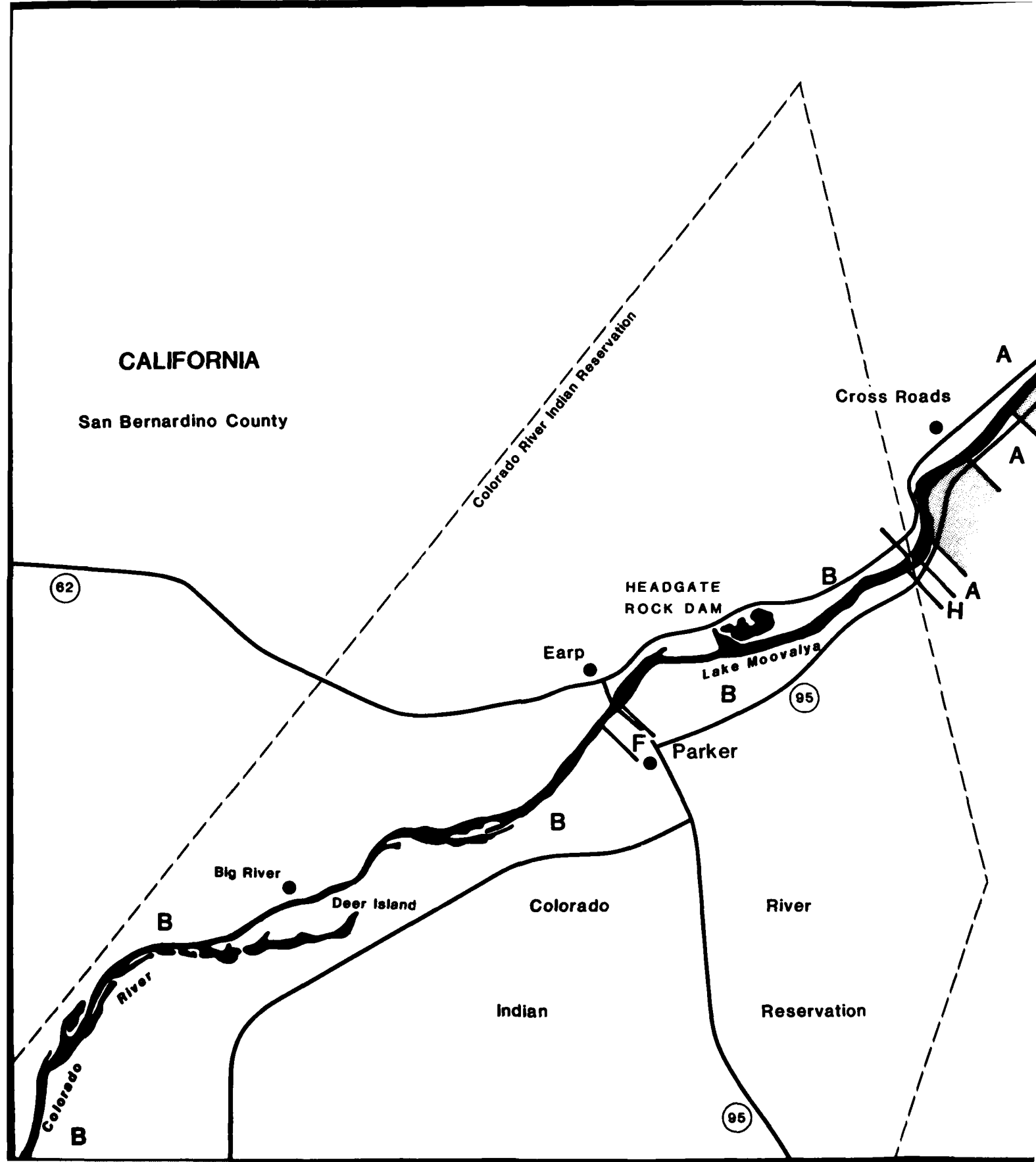
Indian

Reservation

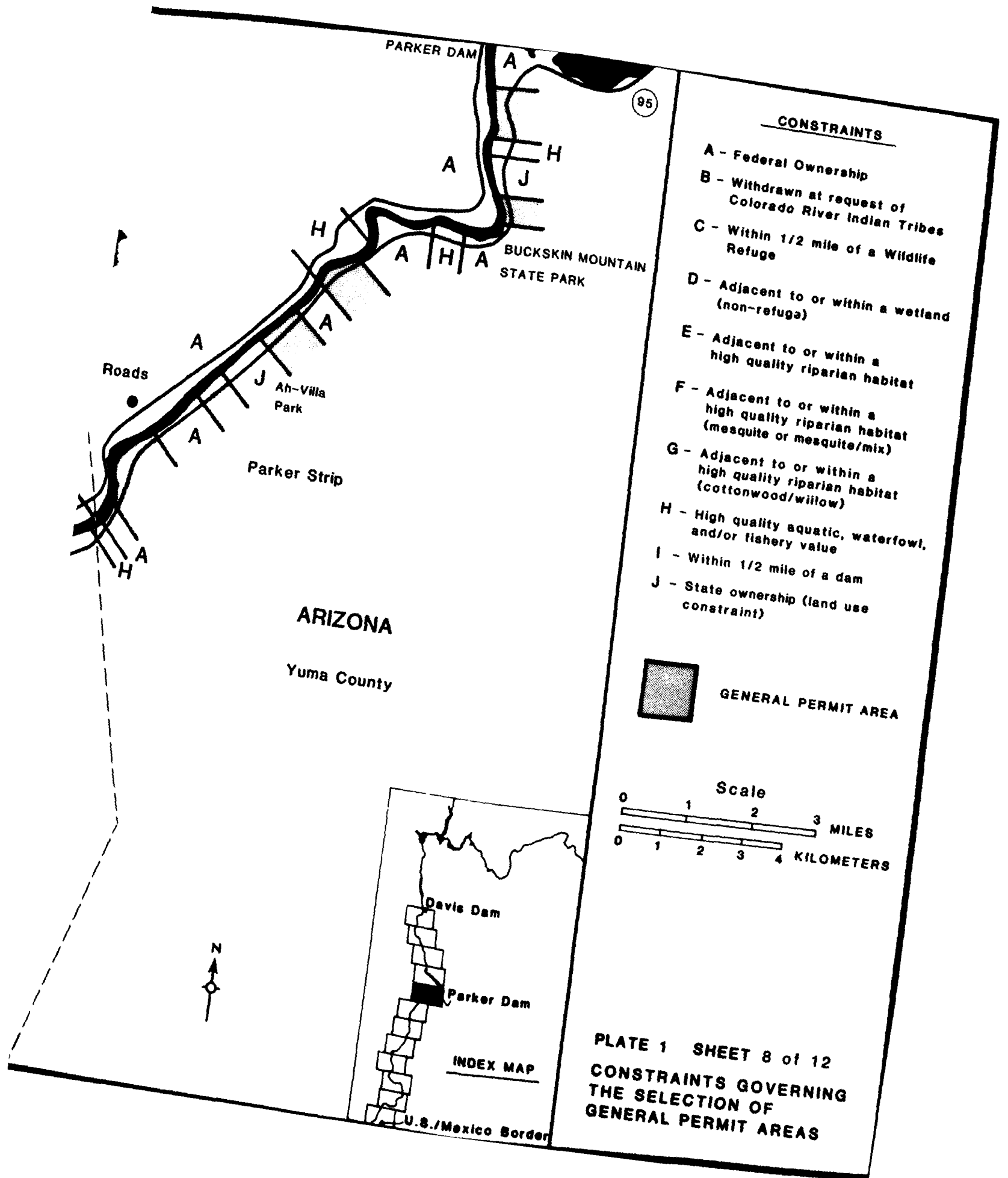
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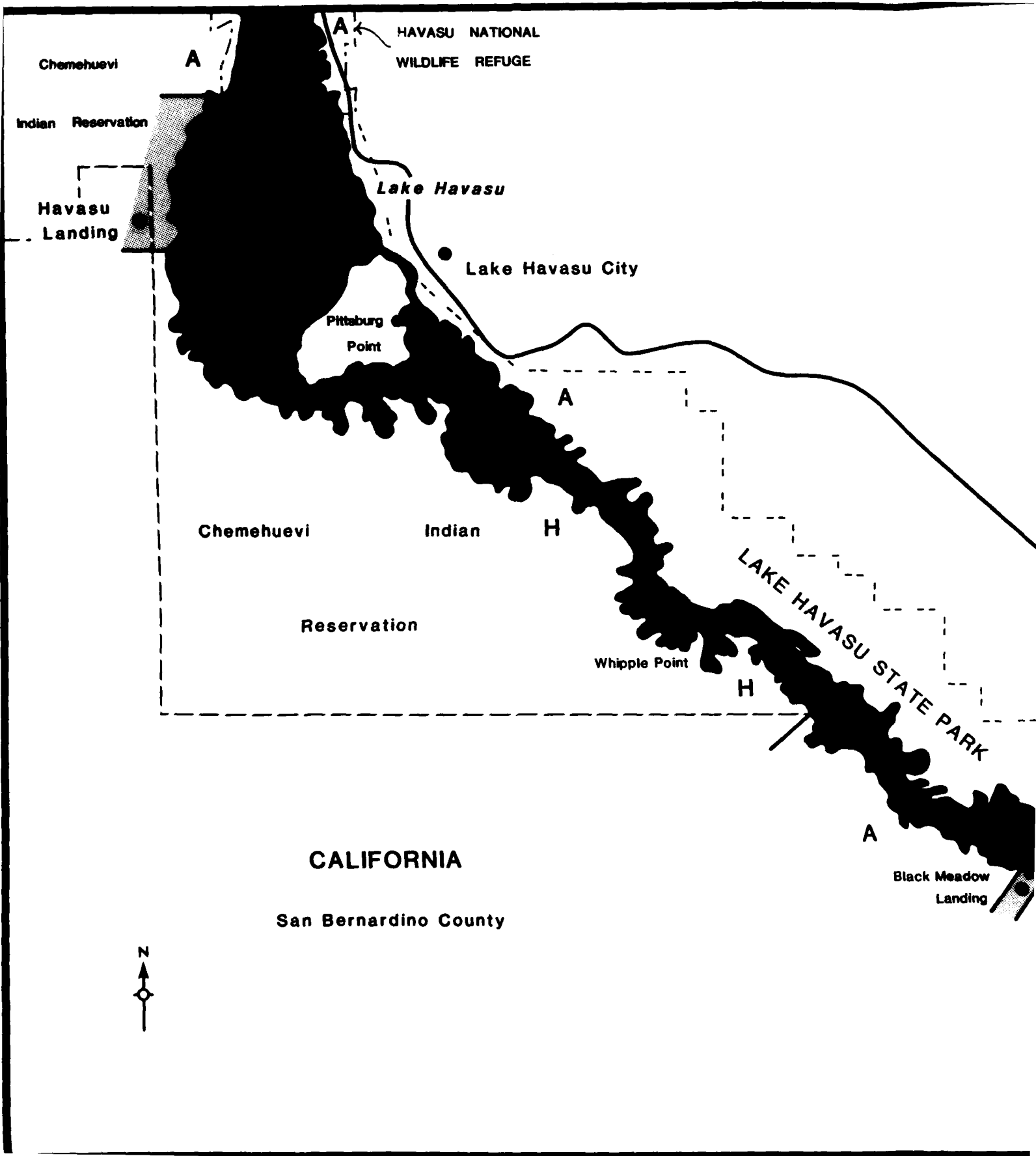
95

95









Chemehuevi

Indian Reservation

Havasus  
Landing

HAVASUS NATIONAL  
WILDLIFE REFUGE

Lake Havasu

Lake Havasu City

Pittsburg  
Point

Chemehuevi

Indian

Reservation

Whipple Point

LAKE HAVASU STATE PARK

Black Meadow  
Landing

CALIFORNIA

San Bernardino County



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GENERAL PERMIT AREA

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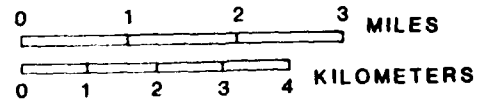
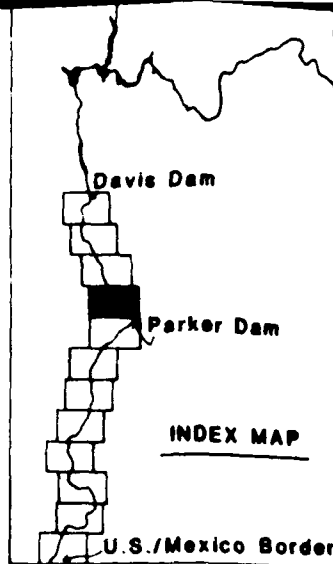
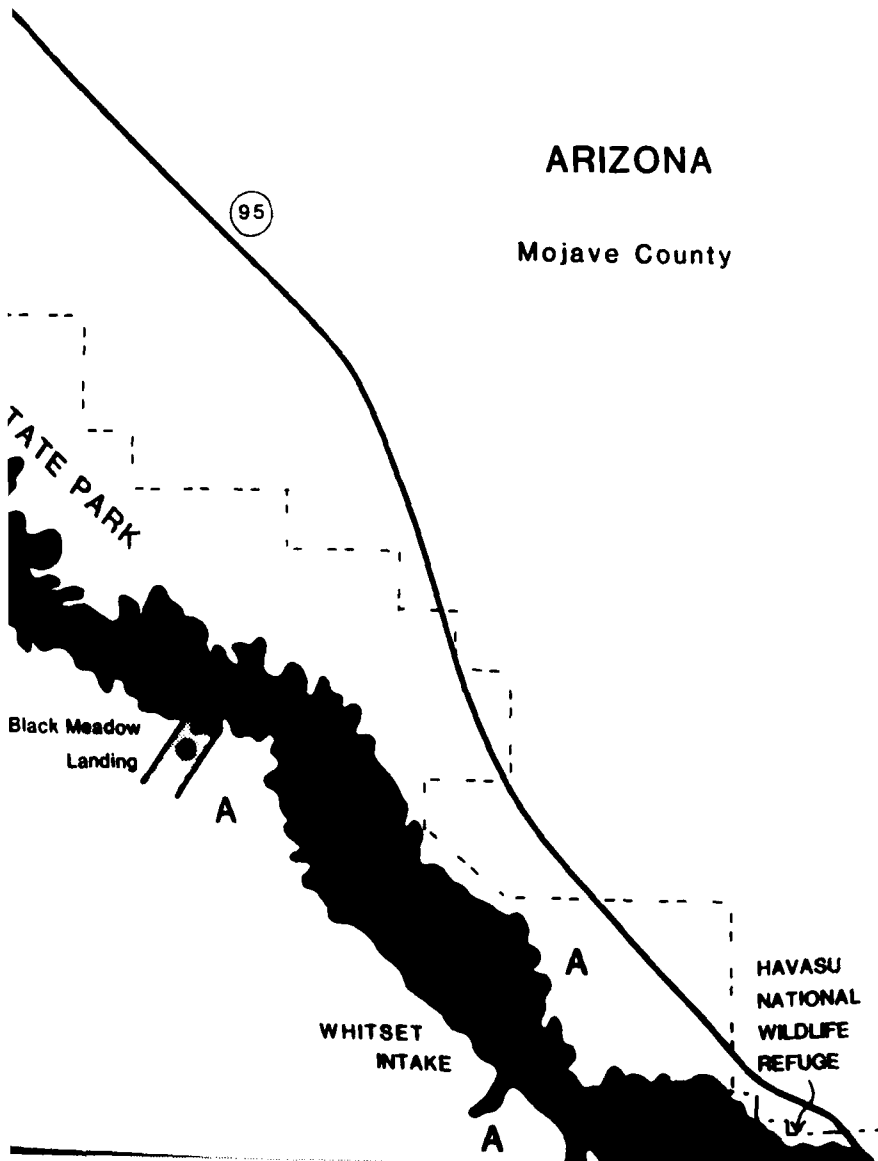


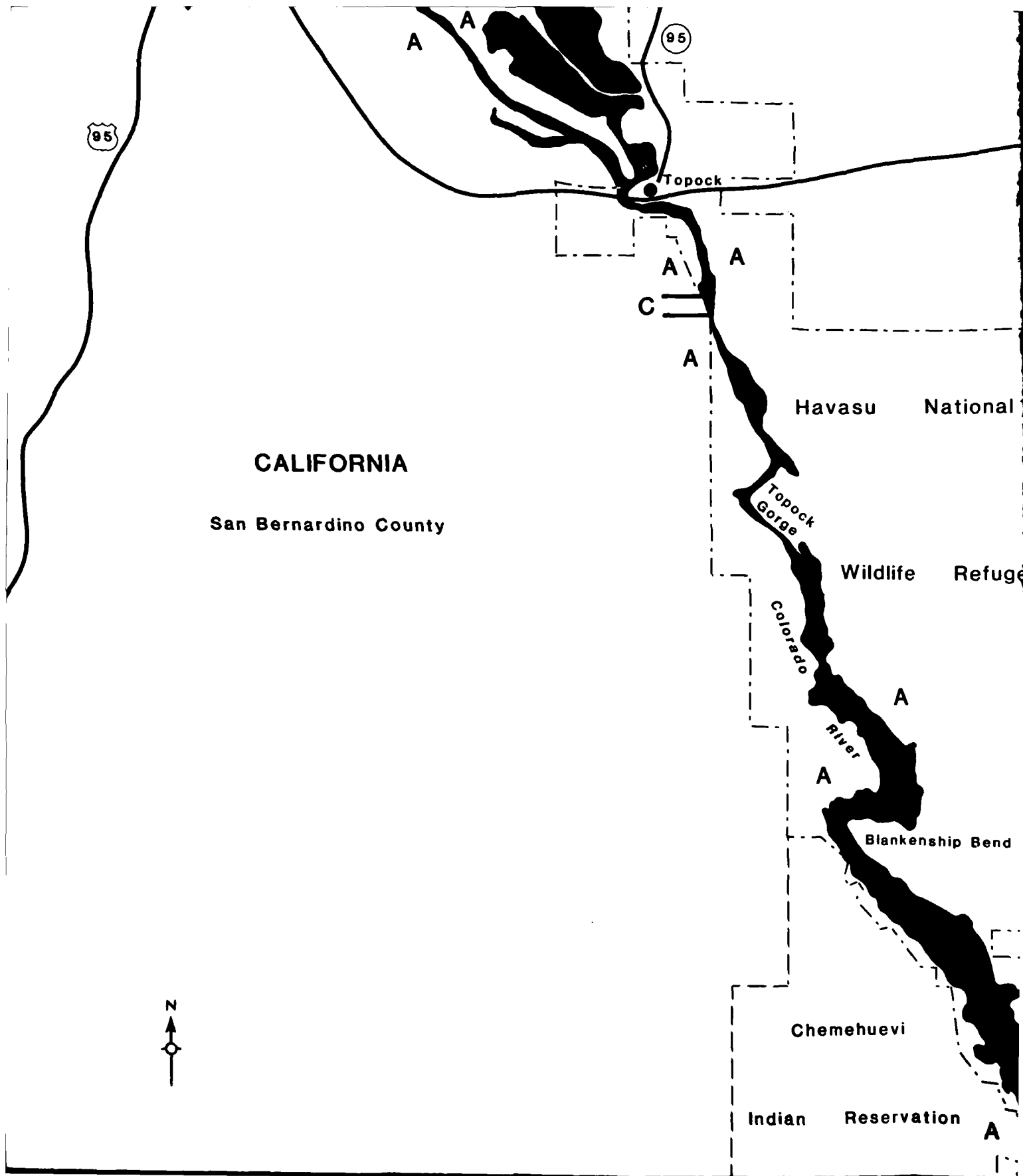
PLATE 1 SHEET 9 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS

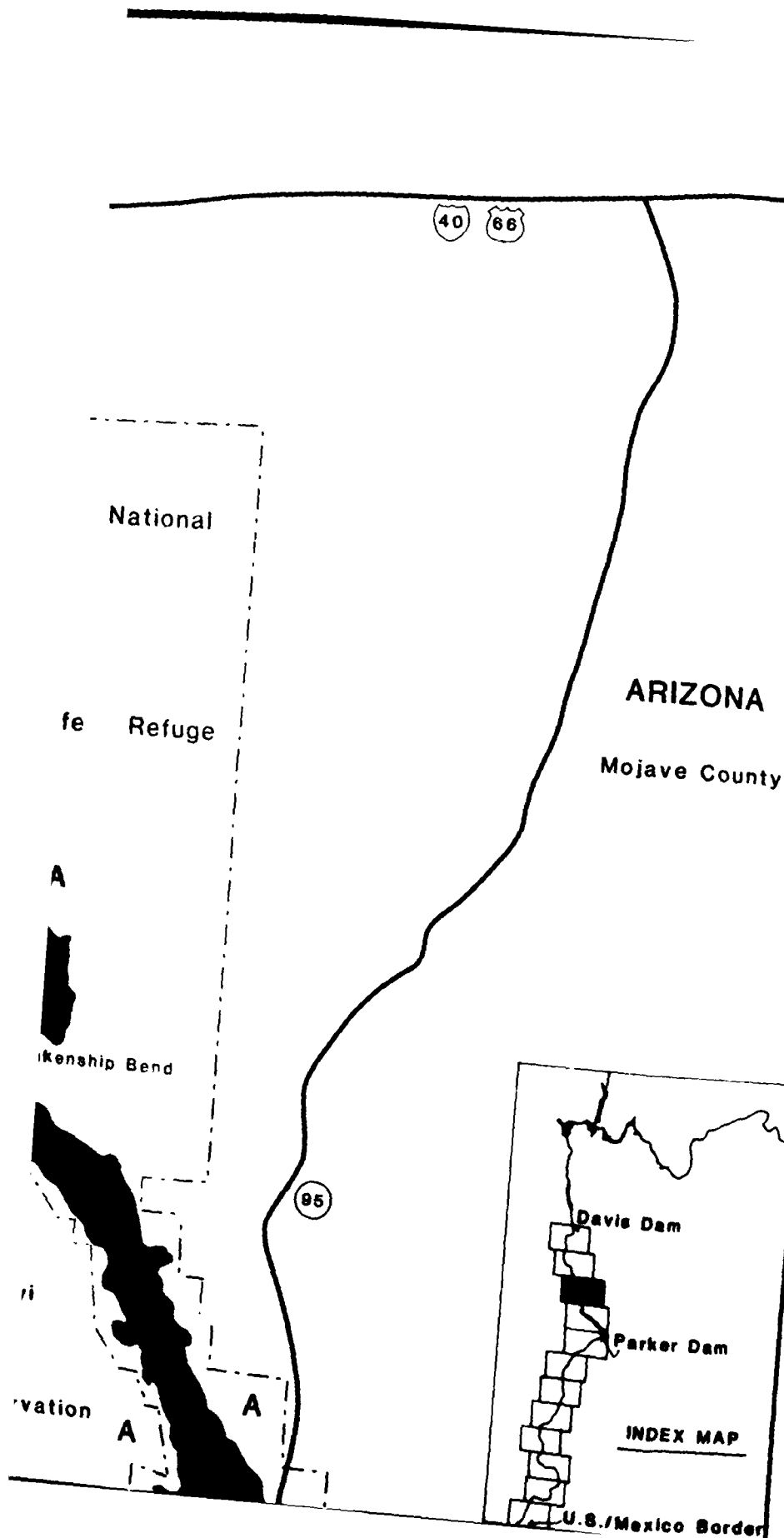


ARIZONA

Mojave County







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GENERAL PERMIT AREA

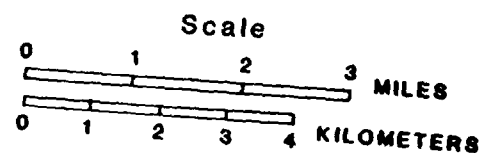
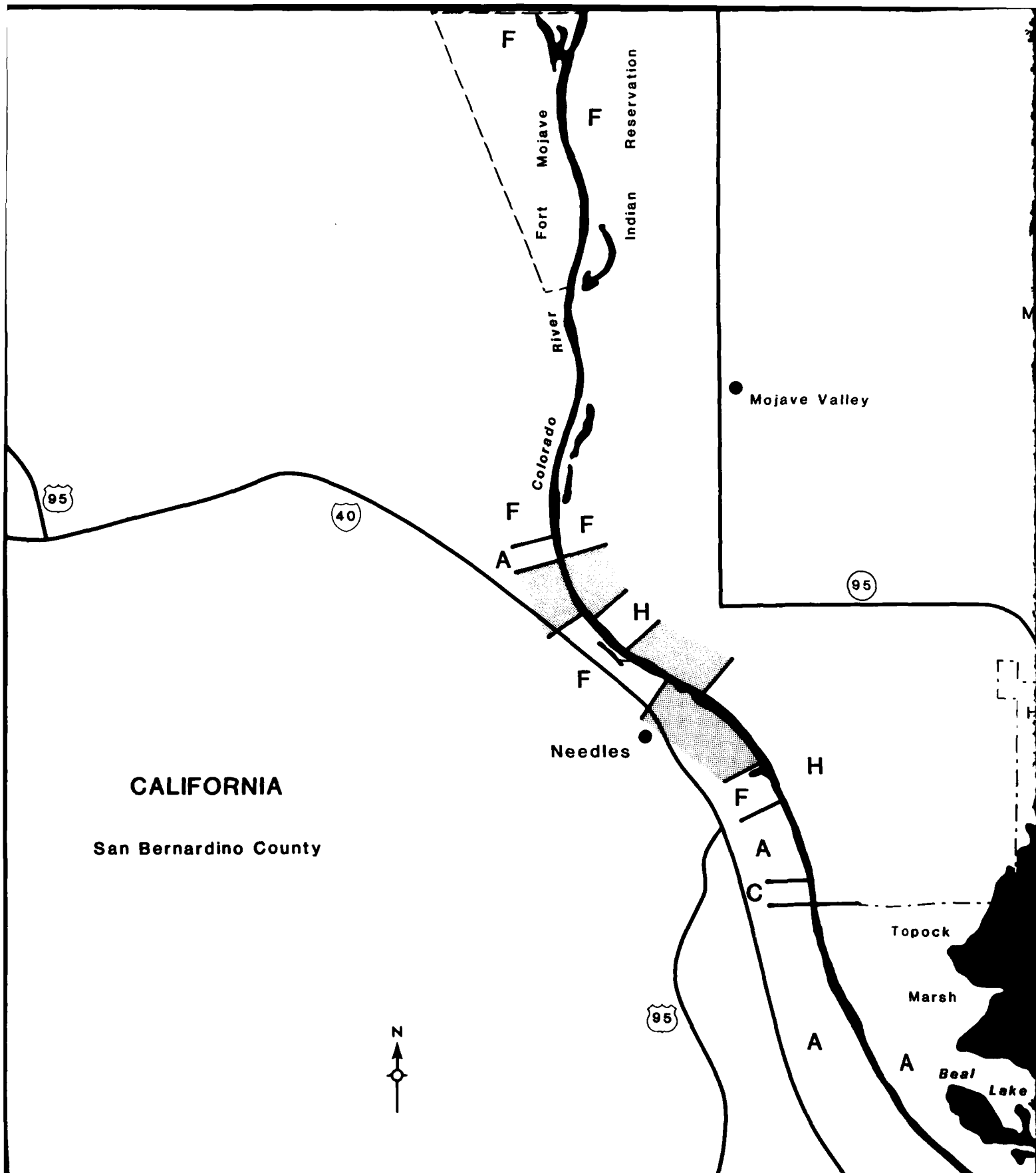
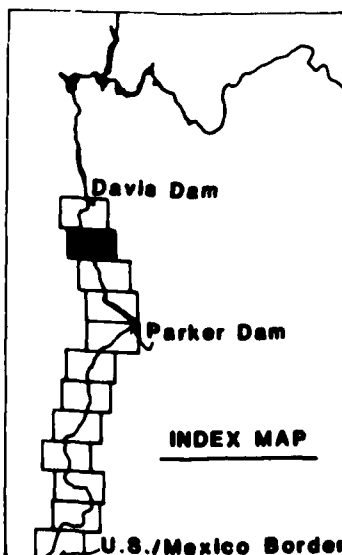
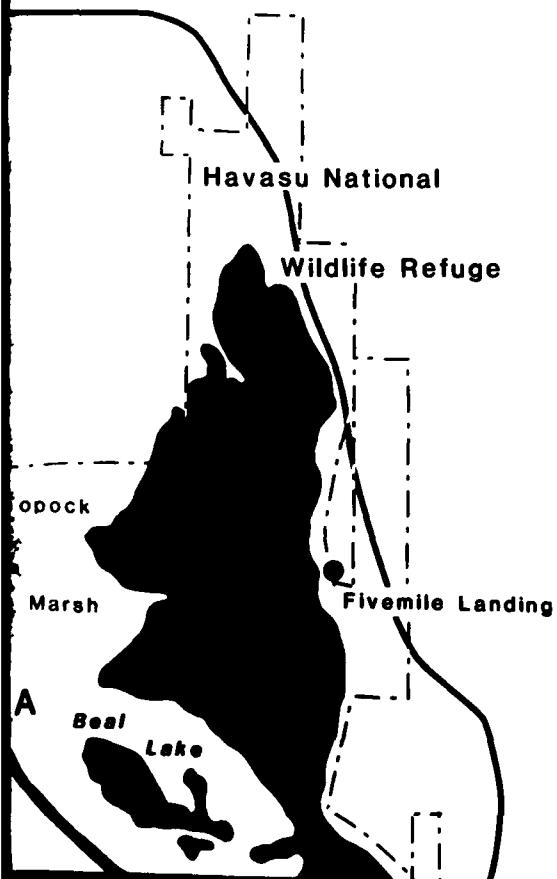


PLATE 1 SHEET 10 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS



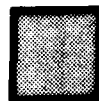
# ARIZONA

Mojave County



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GENERAL PERMIT AREA

## SCALE

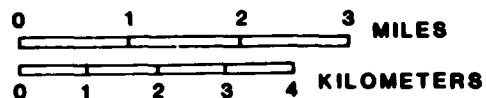
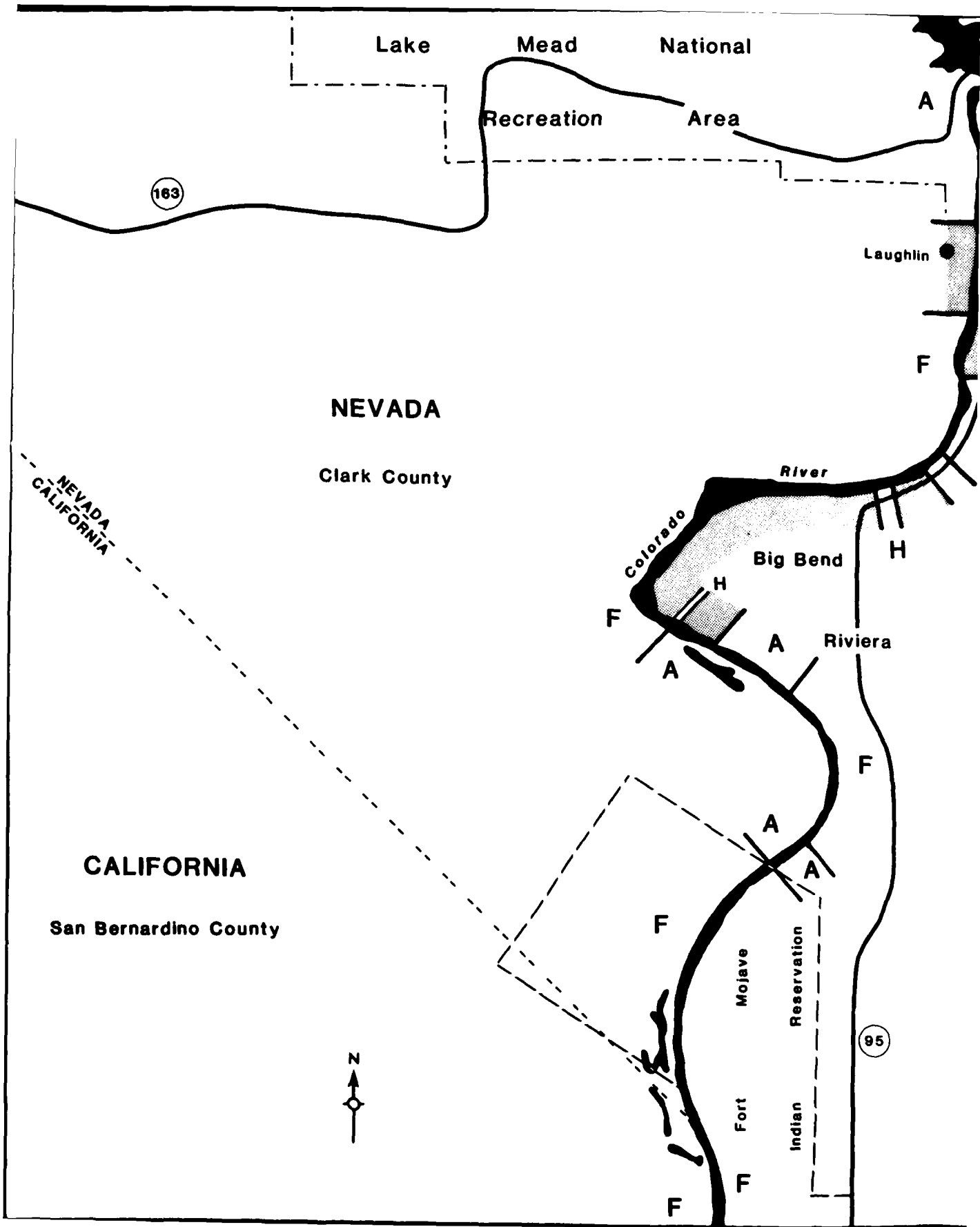
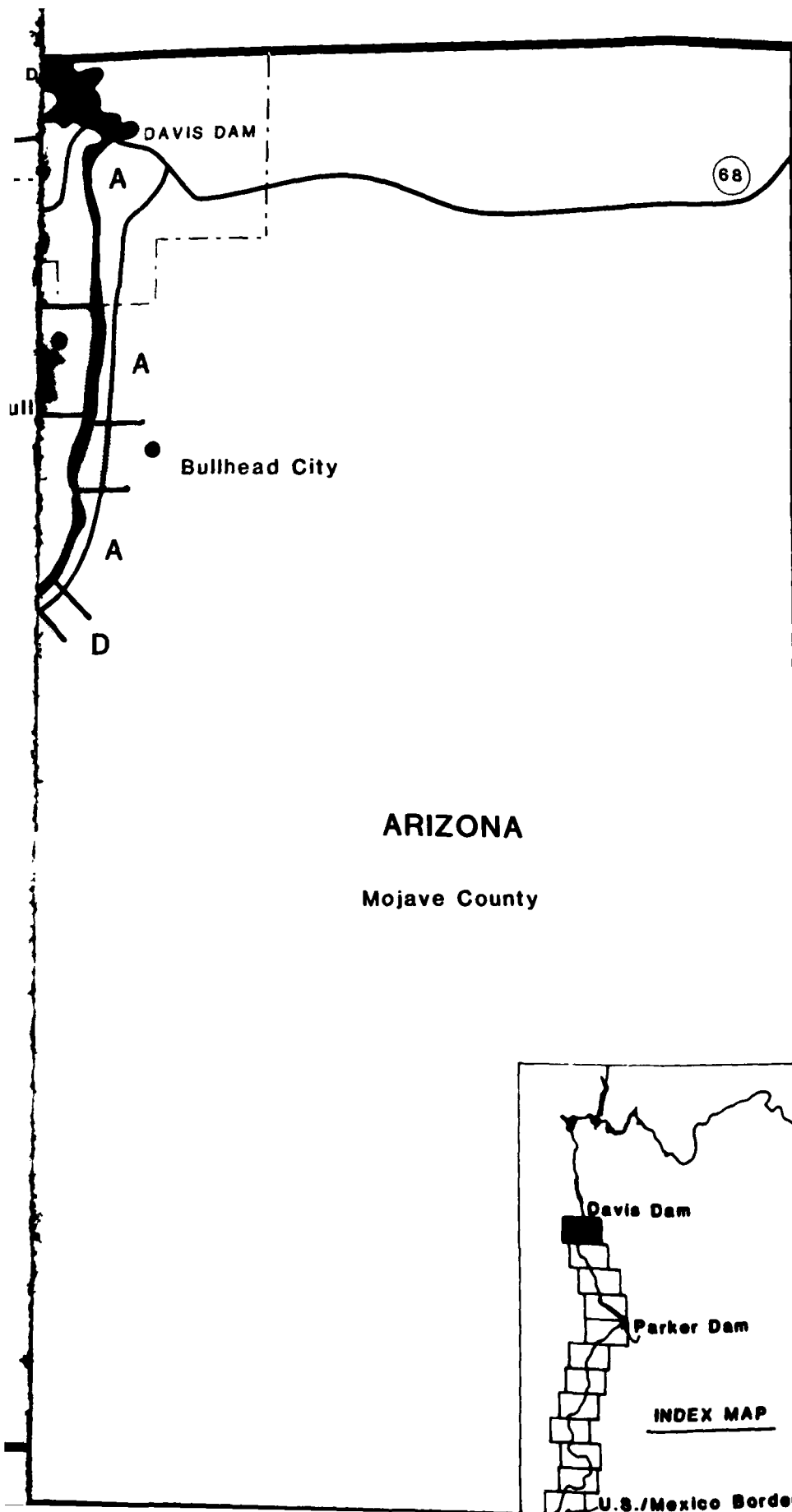


PLATE 1 SHEET 11 of 12  
CONSTRAINTS GOVERNING  
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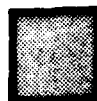






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Scale

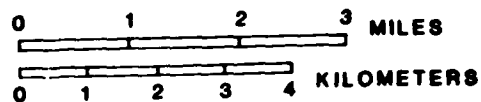


PLATE 1 SHEET 12 of 12  
CONSTRAINTS GOVERNING  
THE SELECTION OF  
GENERAL PERMIT AREAS

## 5. PROPOSED GENERAL PERMIT

The proposed General Permit authorizes the installation and maintenance of five specific categories of structures in designated areas along the lower Colorado River. General Permit areas (as shown in Figures A-1 through A-14) encompass certain stretches of river in the Bullhead City, Laughlin, Needles, Lake Havasu, and Parker Strip areas.

Each of the five categories of authorized structures incorporates certain requirements which must be met before authorization is granted. Examples of the requirements include dimensional criteria or specifications as to type and quantity of fill material. In addition to these criteria, a set of standard and special conditions applies to all activities. For example, under the special conditions it is stated that the General Permit does not authorize projects whose affected area includes a National Register site, or potentially eligible site not yet evaluated under 36 CFR 63. In addition, these conditions stipulate that the permittee must notify the Commander, at least 30 days prior to initiation of the work, providing the Commander with the following:

1. A sketch or plan of the proposed structure showing pertinent dimensions and location of the Ordinary High Water Mark.
2. The location of the proposed structure by Lot and Tract number.
3. The name, address, and telephone number of the permittee.
4. A photograph of the proposed structure site and a photograph of immediately adjacent properties as viewed upstream and downstream from the proposed structure site.
5. A description of the purpose and intended use of the proposed structure.

Under the special conditions the Commander retains the right to determine that any action is not appropriate under the General Permit and require an individual review. Such a determination will normally be made within 20 days of the permittee's written notification.

### STRUCTURES COVERED BY GENERAL PERMIT

The General Permit applies to the following five types of activities; drawings depicting typical structures covered under the General Permit are shown in Figures 2 through 6.

#### Contiguous Bulkhead Wall with Backfill

This structure consists of a vertical wall not exceeding 60 feet in length, and extending not more than 1 foot riverward of the Ordinary High Water Mark. Under the General Permit, bulkhead walls may only be constructed contiguous with, and therefore serve as an extension of, an existing

authorized bulkhead alignment; i.e., for isolated bulkhead walls which do not connect with an existing wall on an adjoining property an Individual Permit will be required.

#### Contiguous Rip-rap Slope

This method of bank stabilization consists of large rocks or boulders piled to produce a stable, loosely consolidated structure lining the bank. Rip-rap slopes may not exceed 60 feet in length under the General Permit. As in the case of bulkhead walls, a rip-rap slope must be constructed contiguous with an existing authorized rip-rap alignment.

#### Sand Beach

The General Permit authorizes the placement of imported sand-sized material (containing not more than 12% silt by weight) and associated grading activities (not more than 5 feet riverward of the Ordinary High Water Mark). Beaches may not exceed 60 feet in length under the General Permit.

#### Individual Boat Dock

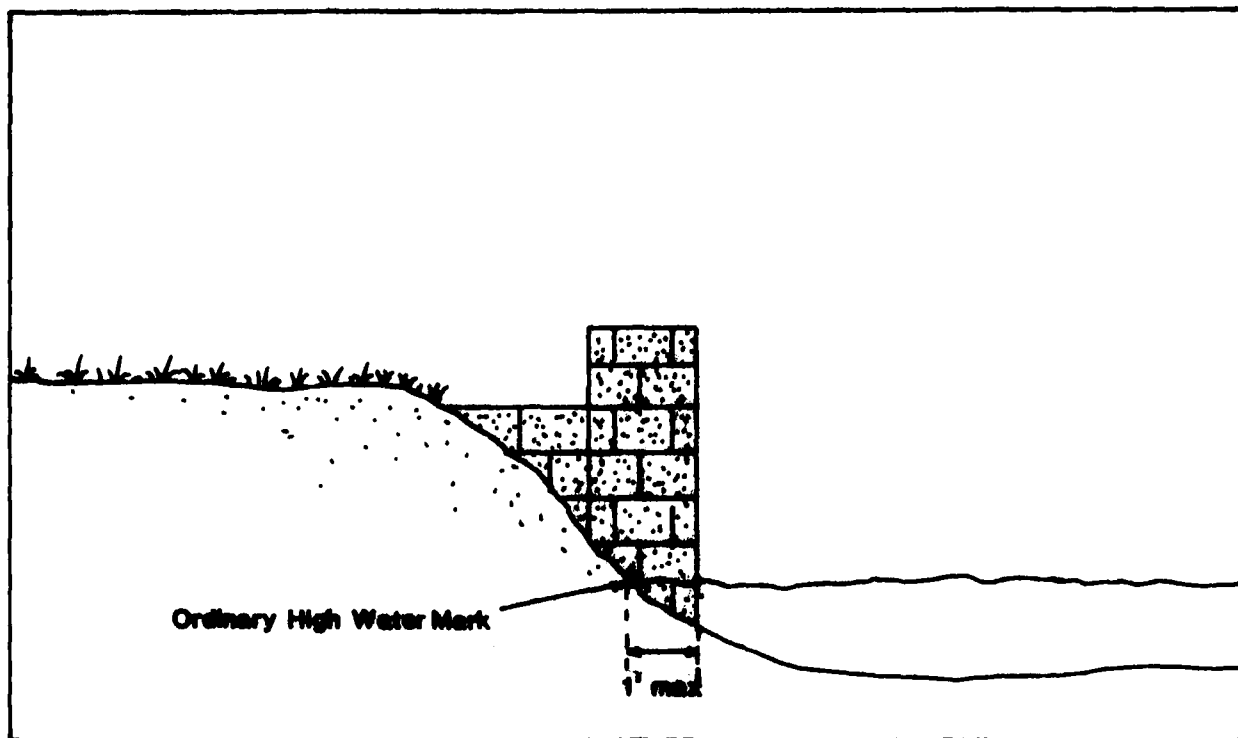
Under the General Permit individual boat docks are defined as structures or combinations of structures, including floating ramps, extending over the river and used primarily for provision of boat moorage, but which may also be used for sunbathing, fishing, and swimming. Boat dock authorization is subject to a set of specific dimensional criteria listed in full in Appendix A of the EIS. An example of the criteria is the requirement that docks do not extend more than 30 feet riverward of the Ordinary High Water Mark.

#### Community Boat Dock

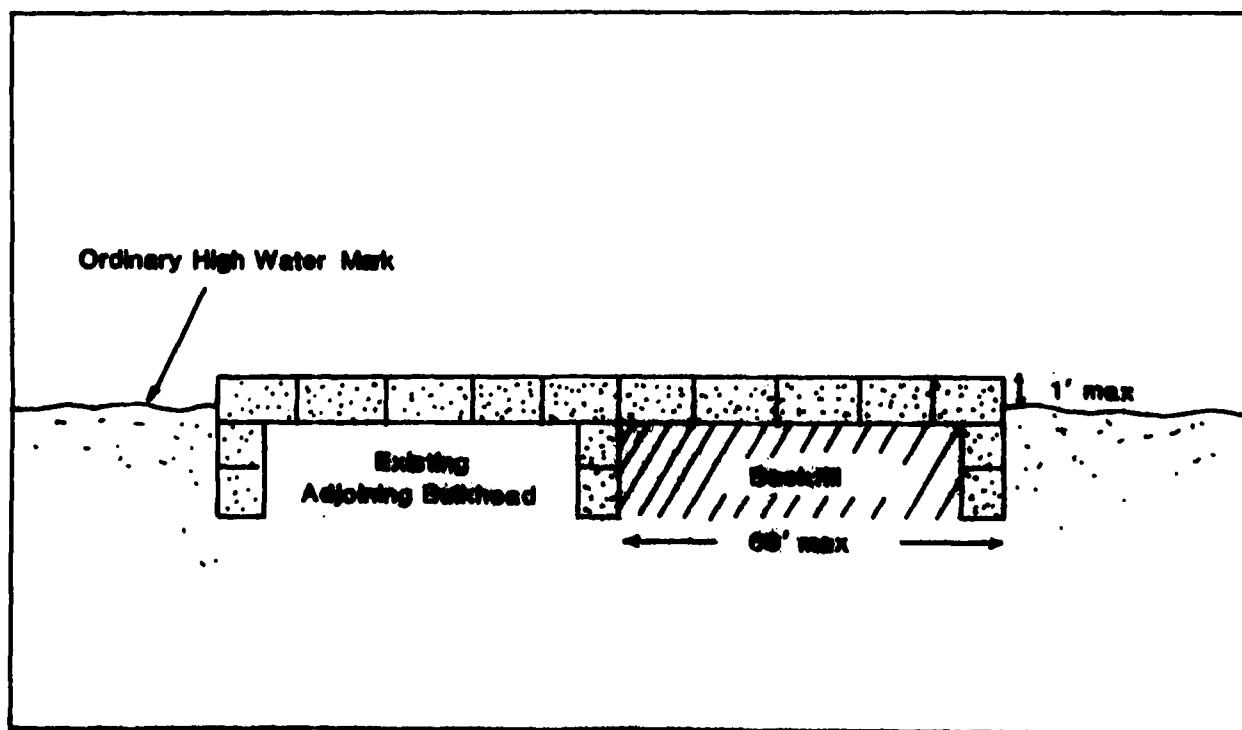
Community boat docks are defined as docks which provide more than one mooring and jointly serve more than one property owner. Dimensional criteria for community docks are contained in Appendix A of the EIS. Community docks are allowed a maximum of five moorings under the General Permit. A minimum frontage of 100 feet is required for authorization. Individual boat docks are excluded from riparian parcels served by community facilities.

The General Permit in its entirety is presented as Appendix A of the EIS. The full set of special and standard conditions are stated therein, as well as a complete listing of requirements for authorization.

The proposed General Permit would accelerate processing time for authorized structures from a current minimum of 90 days to 30 days. The permit would eliminate the need for individual assessment, site-visits, and public notice circulation. Benefits to the public include simplified notification procedures and prompt authorization of projects.

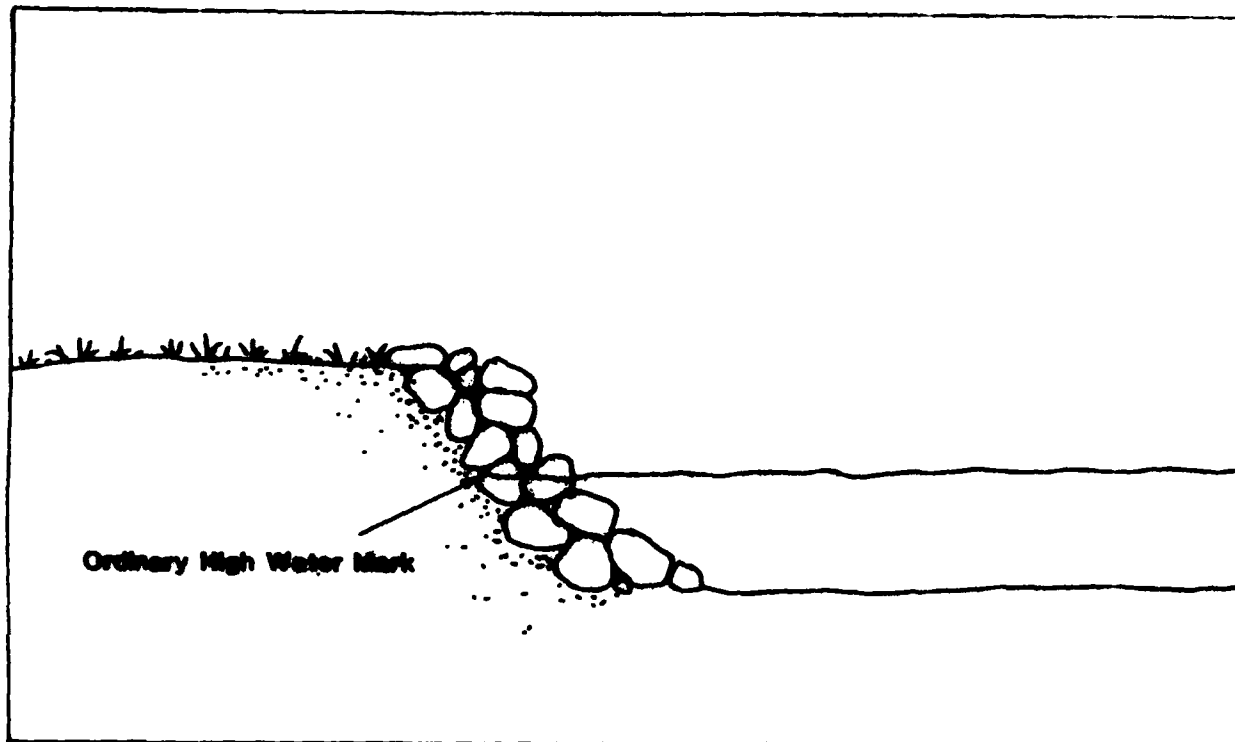


Side View

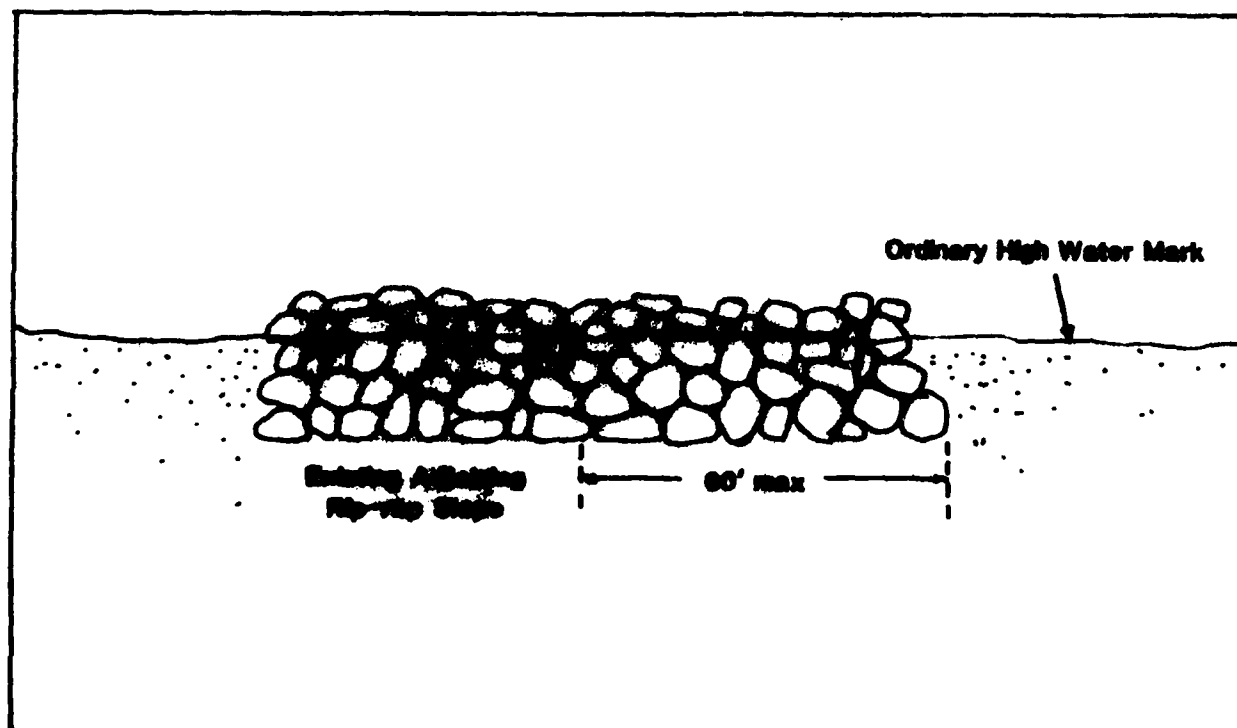


Top View

Figure 2. Contiguous Bulkhead Wall

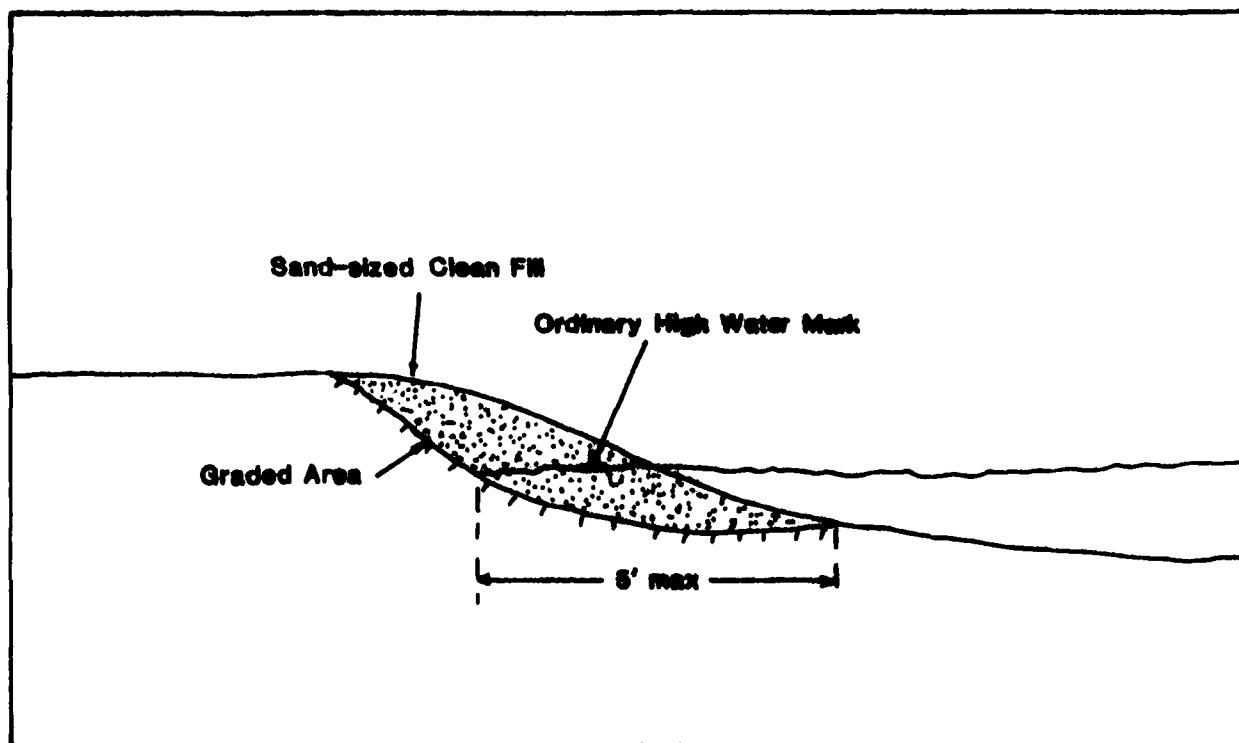


Side View

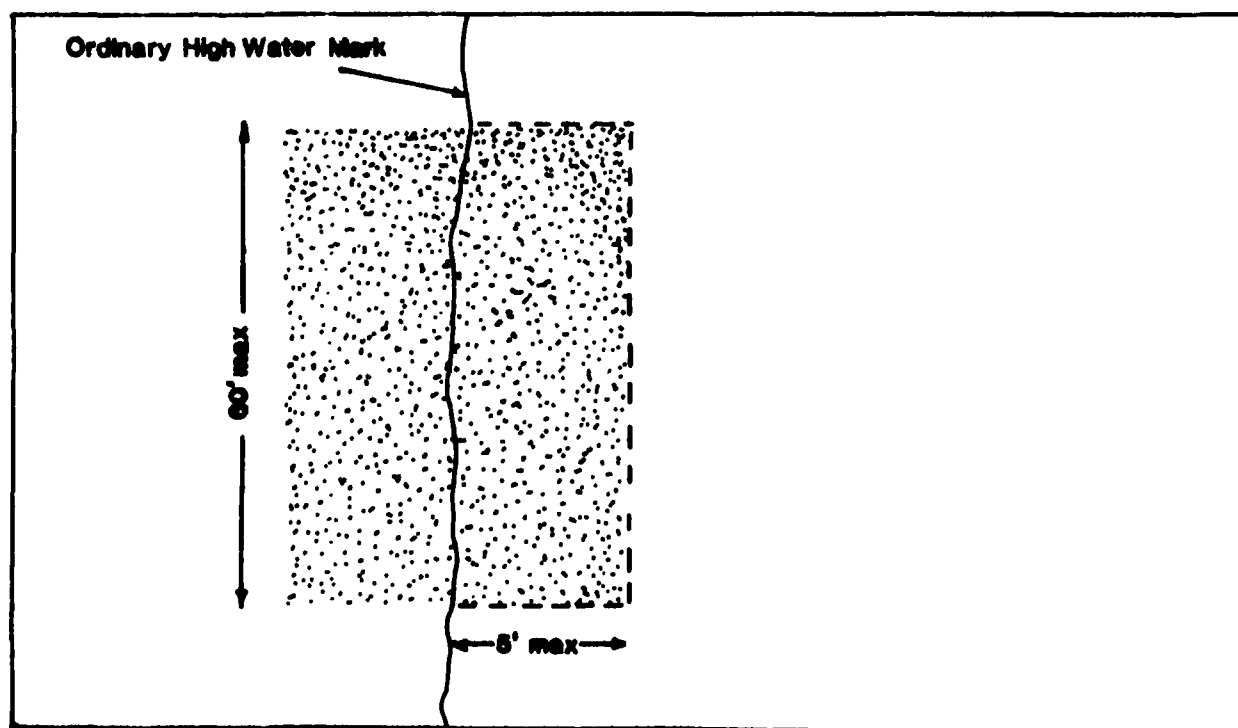


Top View

Figure 3. Contiguous Rip-Rap Slope

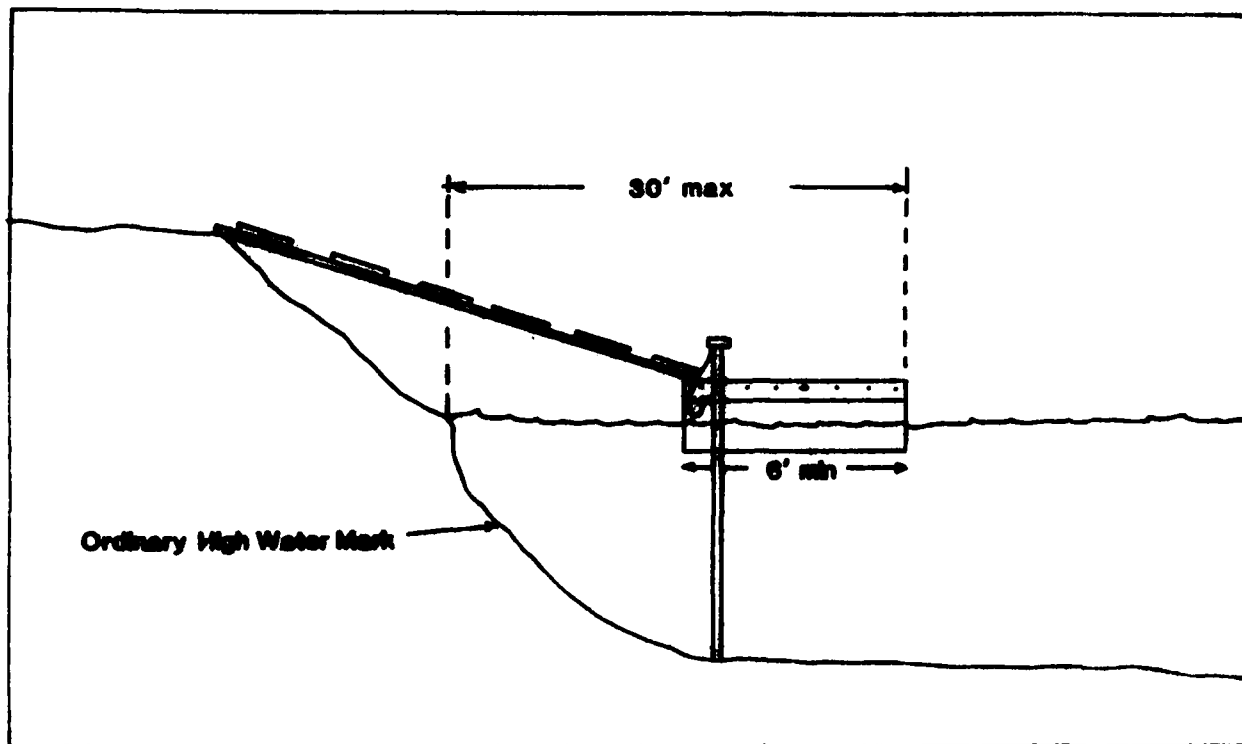


Side View

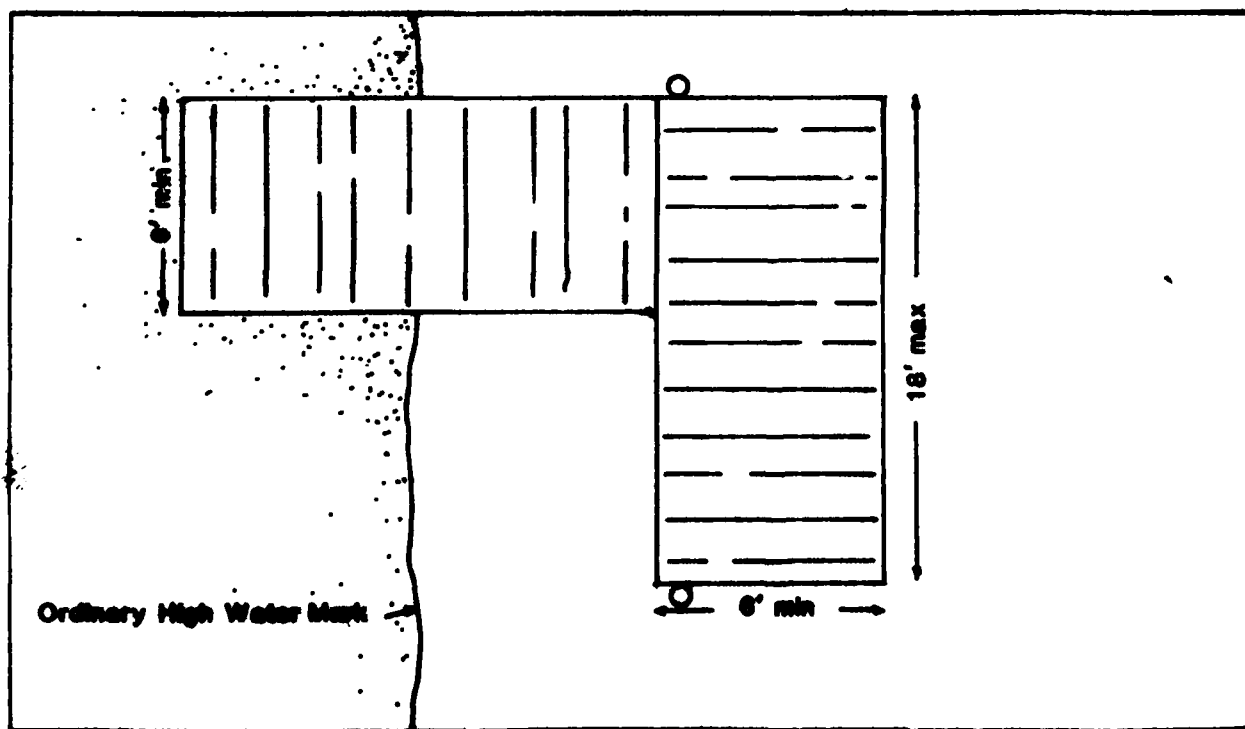


Top View

Figure 4. Sand Beach



Side View



Top View

Figure 5. Individual Boat Dock

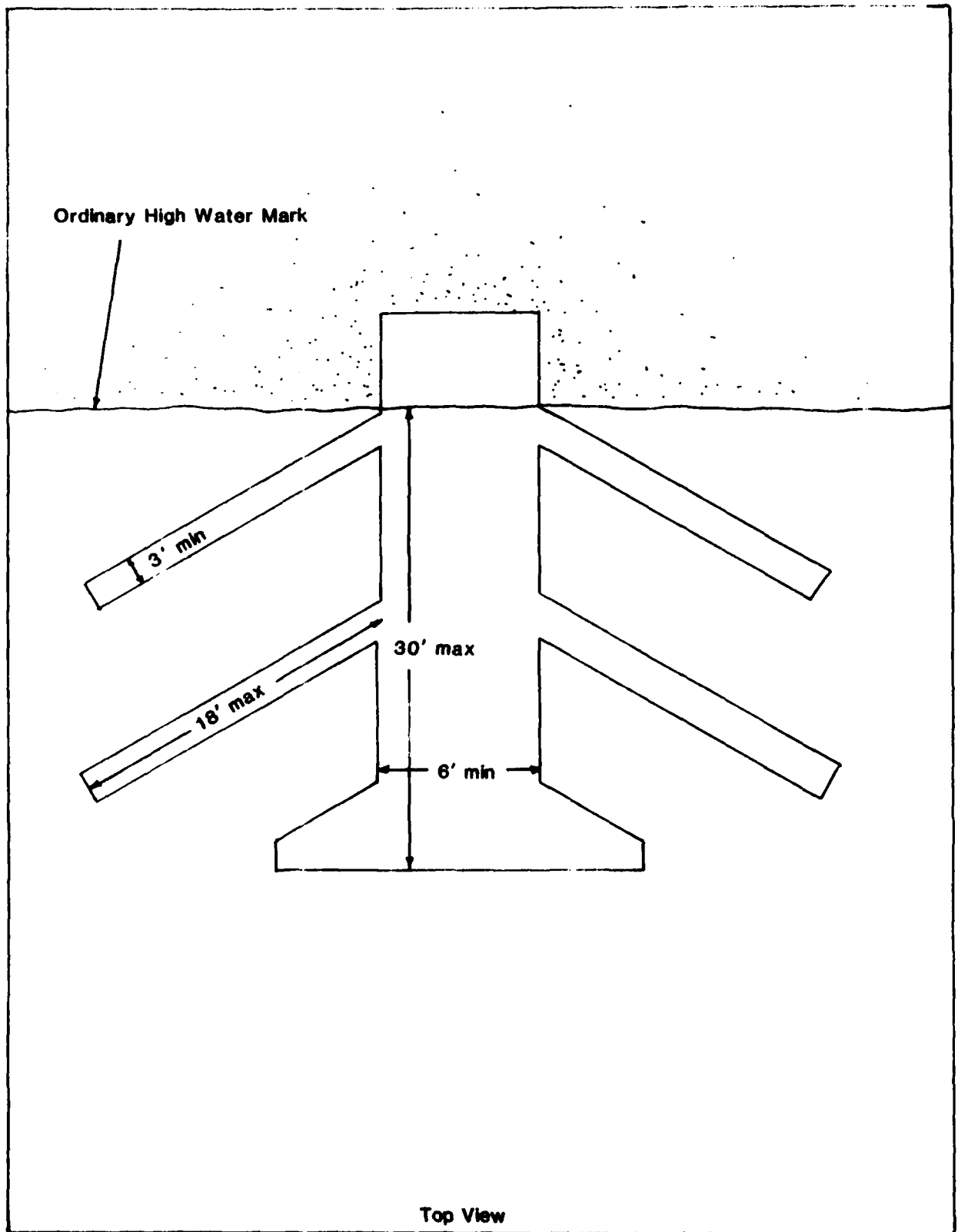


Figure 6. Community Boat Dock



## 6. ALTERNATIVES TO THE PROPOSED ACTION

### NO-ACTION ALTERNATIVE

The No-Action alternative calls for the continued evaluation of applications for single lot improvements in the proposed General Permit areas on an individual basis. Under this alternative, processing demands relative to the capability of the District would remain the same. Processing delays would continue to occur.

Individual site visits would be required for the majority of applied for projects. The minimum processing time for permits would continue to be approximately 90 days.

### PERMIT MORATORIUM ALTERNATIVE

Under this alternative the District would place a moratorium on the issuance of all permits in the proposed General Permit area. This alternative would obviate the need for site visits and virutally eliminate processing demands on the District for these areas.

## 7. ENVIRONMENTAL SETTING

### INTRODUCTION

Riparian structures placed below the ordinary high water mark may directly impact environmental parameters such as water quality to a varying distance downstream or upstream of the project site. In addition, the indirect impacts of a project are not necessarily confined to the immediate construction location. For these reasons, the discussion of affected environment has not been limited to the proposed General Permit areas, but includes the entire lower Colorado River within the jurisdiction of the Los Angeles District. (Figure 7). It is recognized that the major areas of impact are those within the General Permit areas delineated on the maps accompanying the proposed General Permit in Appendix A of the EIS. Hence, the following discussion of the affected environment emphasizes these areas. To facilitate clarity of discussions, the lower Colorado has been divided into 2 segments, as shown in Figure 7. Segment 2 (Davis Dam and South) is further subdivided for certain discussions into 3 subareas, also delineated in Figure 7.

### WATER QUALITY

#### Segment 1. Lee's Ferry to Davis Dam

The impoundment of the Colorado River by Glen Canyon Dam significantly affects downstream water quality. Suspended materials settle out in Lake Powell due to decreased velocity flow; thus, the discharge from Glen Canyon Dam has been reduced in suspended materials compared to the river influent to Lake Powell. However, suspended material loads increase as flow proceeds downstream from the dam due to erosion, runoff, and input from tributaries. The water of the Colorado River and its tributaries in Segment 1 meet the current water quality standards for drinking water (Johnson, 1977). Most of the chemical elements monitored are relatively stable with time and location on the river between Lee's Ferry and Diamond Creek. Sodium is an exception in that its concentration increases with distance downstream from Lee's Ferry. Input from the Little Colorado River, about 50 miles downstream from Lee's Ferry, causes increased salinity in the Colorado River. The salinity is decreased, however, by other tributaries so that the net effect is an increase in salinity of about 0.5 parts per thousand from Lee's Ferry to Diamond Creek. In general, the Colorado River is considered a highly conductive, as well as highly alkaline, system.

The river in Segment 1 is supersaturated with carbon dioxide at Lee's Ferry, but concentration decreases rapidly downstream.

Turbidity and suspended solids are variable relative to spring rains and runoff (Johnson, 1977). Biochemical and chemical oxygen demand are very low. However, there is a possibility of localized health hazards at some camping areas.

Between Hoover Dam and Willow Beach, measurements of pH are about 8 most of the time, and the temperature is relatively constant at about 13C to 14C. Average total dissolved solids (TDS) is 660 to 700 mg/l. The Colorado River from Hoover Dam to Willow Beach is unpolluted and quite suitable for aquatic life (Bryant, 1977).

## Segment 2. Davis Dam to the Mexican Border

SUBAREA A. DAVIS DAM TO PARKER DAM. Water temperatures are least variable near Davis Dam, due to the input of relatively cool hypolimnic waters from Lake Mohave, but are progressively more variable downstream. Temperatures were 17C to 20C near Topock Gorge. Temperatures near Davis Dam were 15C to 16 C in the summer and about 13C in the winter.

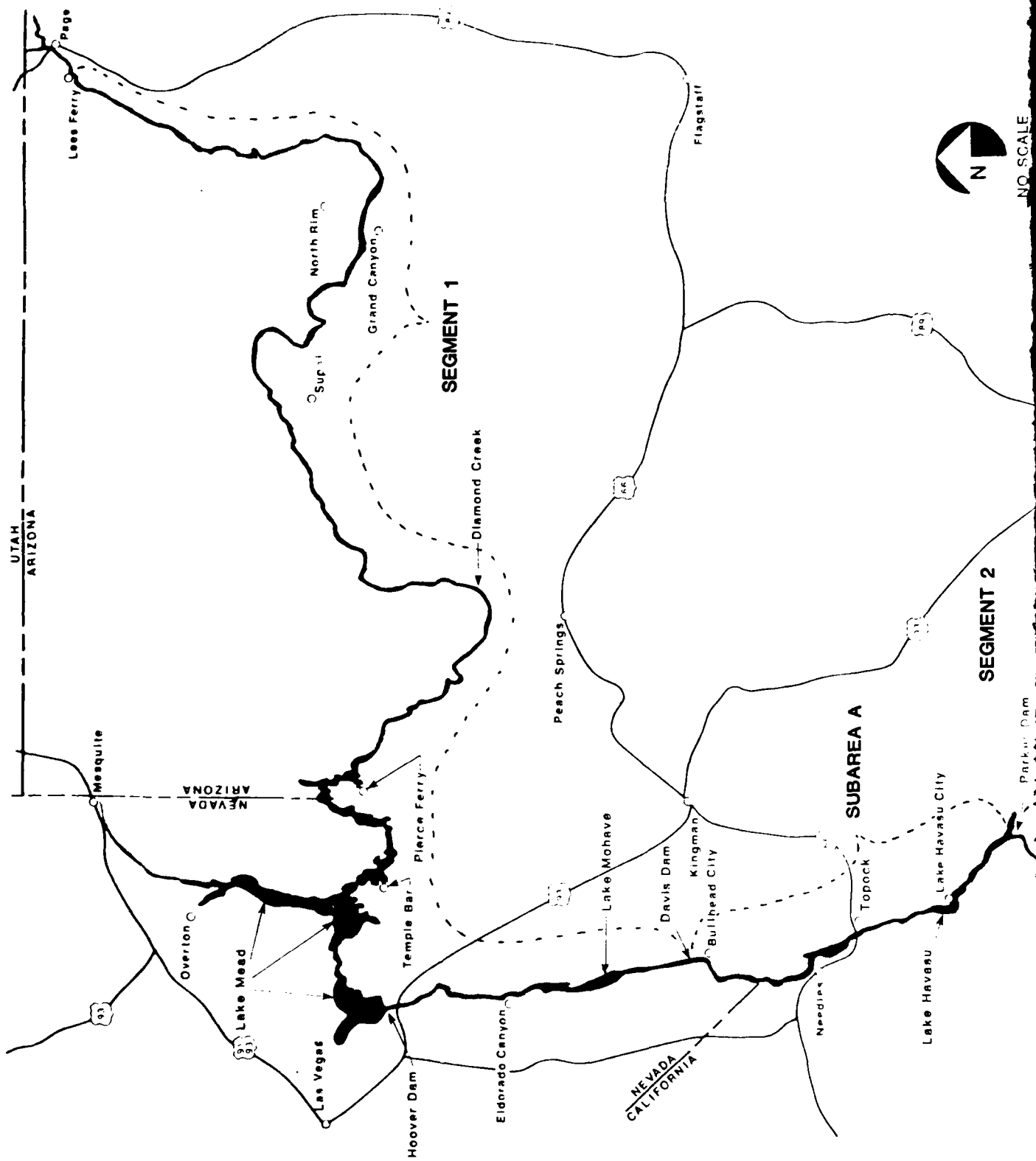
Turbidity is often undetectable where reservoirs provide sediment entrapment (Minckley, 1979). Turbidity is highly variable and is greater in faster flowing waters (Broadway and Herrgesell, 1978). In Lake Havasu, Secchi disc transparency ranged from 1.2 meters to 9.1 meters in the Colorado River arm and from 0.6 meters to 4.6 meters in the Bill Williams arm (USDI, 1975). Data collected in the present study shows a very low level of turbidity ranging from 1.2 NTU (Nephelometric Turbidity Units) below Davis Dam to 4.8 NTU in Lake Havasu.

Concentrations of dissolved oxygen in the mainstream Colorado River are generally greater than 60 percent of saturation during the entire year (Minckley, 1979). Lower dissolved oxygen concentrations were detected below Davis Dam as a result of discharge of hypolimnic waters (colder, deeper waters of a reservoir) that were low in dissolved oxygen. Concentrations increased downstream due to photosynthesis and mixing. Dissolved oxygen concentrations of at least 5 mg/l were observed in Lake Havasu (Ponder, 1975). Oxygen concentration measured in situ in this study area were normally high, ranging from 9.2 mg/l below Davis Dam to 8.4 mg/l in Lake Havasu.

Conductivity is about 900 to 1,000 (micro/mhos per centimeter) at 25C in this section of the river (Minckley, 1979). Immediately below Topock Marsh, conductivity increases to about 1,100 mhos/cm but dilution occurs within 0.5 km. Conductivity measurements taken as part of Phase II showed slightly lower levels than have been previously recorded for this area (Table 1).

Hydrogen ion concentration (pH) typically ranges from 7.8 to 8.2 (Minckley, 1979). Lowest pH measurements are associated with inflow from drains of backwaters, and pH values greater than 8.6 are found only downstream from dense beds of submergent macrophytes (Minckley, 1979). Data from the present study can be seen in Table 1.

Phosphate-phosphorus ( $PO_4-P$ ) concentration is 0.1 mg/l or less throughout this section of the river (Minckley 1979). Distribution of ammonia nitrogen ( $NH_4-N$ ) is variable and is not measured in high levels (Broadway and Herrgesell, 1978). Average  $NO_3-N$  concentrations in the Bill Williams arm of Lake Havasu are about 6.0 mg/l (USDI, 1975). Nitrogen ( $NO_3-N$ ) and phosphate levels were found in the present study to be quite low as would be expected. Data is shown in Table 1.



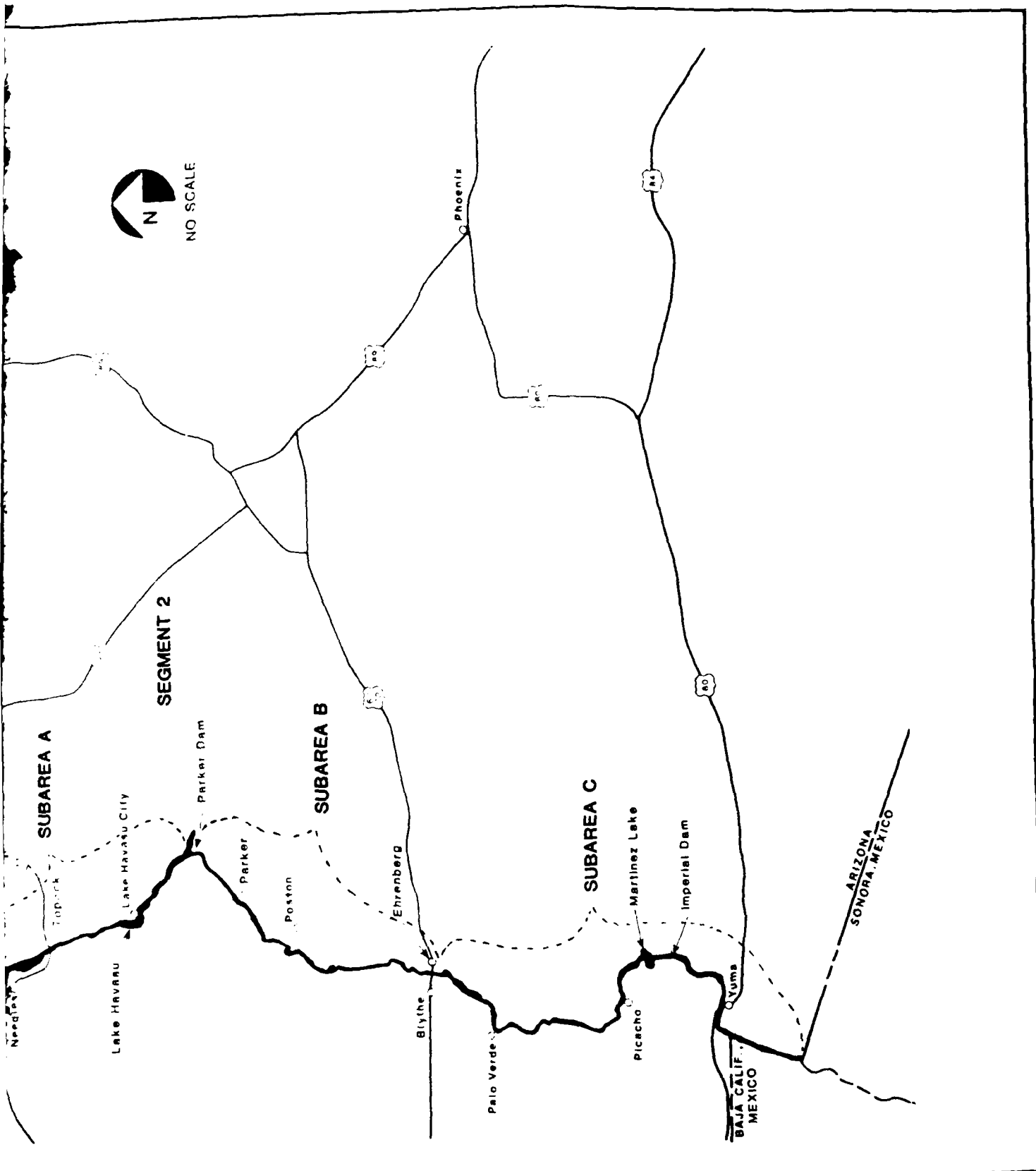


Figure 7. Affected Environment: Lee's Ferry, Arizona to the Mexican Border

Table 1. Water Quality Parameters Measured During Phase II

Water Constituent	Sample Location									
	Davis Dam	Needles (river)	Needles (boat basin)	Lake Havasu	Parker	Colorado Indian Reservation	Palo Verde Diversion	Blythe	P.V. Drain	Imperial Dam
Temperature(°C)	16.5	18.0	18.5	18.0	16.5	17.0	17.0	17.0	18.5	18.5
Oxygen (mg/l)	9.0	9.0	8.7	8.4	9.4	9.0	9.0	8.9	9.0	8.8
Conductivity (µmhos/cm)	700.0	720.0	720.0	725.0	750.0	750.0	760.0	760.0	750.0	780.0
Turbidity (NTU)	1.2	0.8	1.2	4.8	0.5	0.6	0.8	0.5	0.6	0.5
Alkalinity (as CaCO <sub>3</sub> )	131.0	138.0	133.0	135.0	133.0	133.0	133.0	135.0	133.0	135.0
Total Hardness (as CaCO <sub>3</sub> )	341.0	339.0	337.0	333.0	346.0	348.0	343.0	343.0	346.0	348.0
Nitrites (NO <sub>2</sub> )	0.03	0.02	0.06	0.04	0.09	0.11	0.01	0.14	0.11	0.01
Nitrates (NO <sub>3</sub> )	1.02	0.91	0.92	0.55	1.5	3.9	0.89	1.2	1.3	0.86
Total Phosphate	0.02	0.05	0.04	0.07	0.04	0.04	0.03	0.04	0.06	0.12
Orthophosphate	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Silica (SiO <sub>2</sub> )	9.0	7.0	8.0	6.0	7.0	6.0	6.6	7.0	7.0	6.2
Sulfate (SO <sub>4</sub> )	305.0	291.0	299.0	311.0	284.0	281.0	272.0	334.0	339.0	291.0
pH	7.9	7.8	7.7	7.7	7.0	6.9	7.5	6.8	6.8	7.5

All units are as mg/l (parts per million) unless otherwise indicated.

SUBAREA B. PARKER DAM TO BLYTHE. The temperature regime in this section of the river is quite different from other sections because relatively warm water is discharged from Parker Dam as a result of the instability of the hypolimnion in Lake Havasu (Minckley, 1979). The hypolimnion in Lake Mohave is more stable and the hypolimnic discharge is cooler. Summer river temperatures below Parker Dam (Lake Havasu) are 25C to 30C compared to 15C to 16C below Davis Dam (Lake Mohave). Temperatures show expected diurnal fluctuations, being highest in mid-afternoon and lowest in the morning.

Conductivity varies widely with no significant difference upstream or downstream (Minckley, 1979). Turbidity is low with the average never being greater than 10 Jackson Turbidity Units (JTU) for a 24 hour period. Higher turbidity is observed during the day than at night due to increased flow during the day that is required in order to meet irrigation and other needs downstream (Minckley, 1975).

Phosphate-phosphorus is less than 0.01 mg/l in the upper reaches of this section of the river, increasing to about 0.4 mg/l just upstream from Poston Wasteway. Downstream from Poston Wasteway  $PO_4-P$  was about 0.7 mg/l (Minckley, 1979). High levels of nitrates and nitrites were found in the section of the river running through the Colorado River Indian Reservation. Potential sources of these levels were not identified.

SUBAREA C. BLYTHE TO THE MEXICAN BORDER. Water temperatures range from about 10C to 12C in the winter to about 28C in the summer (Minckley, 1979). Between Yuma, Arizona and the Mexican border, water temperatures in the channel are warmer in the summer and cooler in the winter than reaches upstream from Yuma. Temperatures in oxbow lakes and drains are generally warmer in the summer and cooler in the winter than in the channel. Temperatures range from 14.4C to 33.6C in these backwaters (Ponder, 1975).

Dissolved oxygen concentration is near 100 percent of saturation at all times (Minckley, 1979). Concentrations as great as 121.5 percent of saturation have also been measured at the northern end of the segment. Dissolved oxygen gradually decreases below Yuma, Arizona, possibly due to organic loading. Bottom sediments below Morelos Dam consume oxygen by reduction; therefore, bottom waters should be low in dissolved oxygen. They are not, however, due to seepage of water high in dissolved oxygen from Morelos Dam. In Hunter's Hole, a backwater in the southern portion, oxygen depletion is evident in deeper waters. Other backwaters are near or greater than 100 percent of saturation at the surface and are rarely below 50 percent of saturation at the bottom. Oxygen levels were quite high in samples taken in situ during the present study (Table 1).

Hydrogen ion concentration (pH) fluctuates between 7.0 and 8.6 (Minckley, 1979). The majority of the pH measurements, however, are from 7.9 to 8.4. Backwater pH measurements range from 8.0 to 8.6 (Ponder, 1975). Backwaters and drains fluctuate less in pH than does the channel (Minckley, 1979). In deeper backwaters, lowest pH is associated with low dissolved oxygen concentration near the bottom.

Conductance varies from 690 to 1,630 mhos/cm. The general trend is for progressive increase in conductance upstream to downstream. Greater conductance may be attributed to input of more saline waters from drains and canals. Salinity progressively increases downstream throughout the lower Colorado River because water used for irrigation, high in salt content due to leaching from the soil and evaporation, is returned to the river in lower reaches (Minckley, 1979). Conductance in backwaters was greater than in the channel usually by 100 to 500 mhos/cm (Ponder, 1975).

Turbidity downstream of Yuma, Arizona ranges from none detected to about 55 JTU (Minckley, 1979). Higher turbidities are found near the Laguna desilting facilities. From Yuma to the Mexican border, turbidity ranges from 1 to 160 JTU. Turbidity in backwaters is generally greater than in the channel because of phytoplankton blooms and forage fish such as carp that stir up the bottom while feeding. Secchi disc depths range from 0.1 m to 8.5 m in the backwaters; however, most of the depths are less than 3 meters.

Phosphate-phosphorus ( $PO_4$ -P) generally averages about 0.1 mg/l (Minckley, 1979). Maximum  $PO_4$ -P measured in the channel was 0.3 mg/l at Morelos Dam (Broadway and Herrgesell, 1978). Concentrations of phosphate-phosphorus are greater downstream from drains where large amounts enter the channel. In the Gila River near Yuma, phosphate-phosphorus is as high as 0.65 mg/l. Some backwaters are higher in phosphate-phosphorus than the channel (Minckley, 1979). Lower  $PO_4$ -P occurred where high primary productivity was consuming the nutrient. Phosphates were higher near Imperial Dam (0.12 ppm) than in any other area sampled (Table 1).

Concentrations of nitrate-nitrogen  $NO_3$ N are about 0.1 mg/l in the channel and vary from none detected to greater than 0.1 mg/l in backwaters (Broadway and Herrgesell, 1970). Nitrates in this section are generally at the same level as elsewhere in the study area, but were higher than previously noted (Table 1). Nitrites are generally low throughout the lower Colorado. This portion of the river is also characterized by good bacteriological water quality.

## AQUATIC BIOLOGY

### Fish

SEGMENT 1: LEE'S FERRY TO DAVIS DAM. A list of species of fish collected or observed in each segment of the lower Colorado River is presented in Table 2. The number of references found in the literature for each fish species in each river segment is also presented in Table 2. The fishes are divided into native species, introduced species, and hypothetical species. Native species are those occurring naturally in the area (indigenous species), and introduced species are those present as intentional or unintentional transplants into the area that have adapted to the environment. Hypothetical species are those introduced into the area at some time but the present status of which is uncertain.



Five native fish species and six introduced species occur from Lee's Ferry to Diamond Creek. The humpback chub (Gila cypha), the bonytail chub (Gila elegans), and the Colorado squawfish (Ptychocheilus lucius) are 3 endangered species which may occur in this segment (USDI, 1979). References to the presence of the humpback chub in the Colorado River mainstem include Johnson (1977) and Minckley (1973). The Little Colorado River, as well as other tributaries, serves as a refuge for several native species such as the humpback chub and bonytail chub, both of which are declining in numbers.

Table 2. Species of Fish Collected or Observed in Each Segment of the Lower Colorado River with the Number of References Available in the Literature.

Species	River Segment			
	I	II		
		A	B	C
<b>NATIVE SPECIES</b>				
Machete, <u>Elops affinis</u>				2
Humpback chub, <u>Gila cypha</u> <sup>1</sup>	1			
Bonytail chub, <u>Gila elegans</u> <sup>1</sup>	5	1	1	2
Roundtail chub, <u>Gila robusta</u>				2
Colorado squawfish, <u>Ptychocheilus lucius</u> <sup>1,2</sup>	3			
Razorback sucker, <u>Xyrauchen texanus</u>	4	3	1	2
Flannel mouth sucker, <u>Catostomus latipinnis</u>	3	1		2
Desert pupfish, <u>Cyprinodon macularis</u>			1	2
Striped mullet, <u>Mugil cephalus</u>				4
Speckled dace, <u>Rhinichthys osculus</u>	3			
Bluehead sucker, <u>Pantosteus discobolus</u>	3			
<b>INTRODUCED SPECIES</b>				
Threadfin shad, <u>Dorosoma petenense</u>	1	4	1	3
Rainbow trout, <u>Salmo gairdneri</u>	6	3	2	
Carp, <u>Cyprinus carpio</u>	7	5	4	8
Goldfish, <u>Carassius auratus</u>		2	1	3
Golden shiner, <u>Notemigonus crysoleucas</u>		2	1	1
Red shiner, <u>Notropis lutrensis</u>	1	1	2	4
Fathead minnow, <u>Pimephales promelas</u>	2	1	1	1
Flathead catfish, <u>Pylodictus olivaris</u>			2	7
Channel catfish, <u>Ictalurus punctatus</u>	6	6	4	8
Black bullhead, <u>Ictalurus melas</u>	2	1	1	2
Yellow bullhead, <u>Ictalurus natalis</u>	1	5	3	8
Mosquitofish, <u>Gambusia affinis</u>	1	1	1	3
Shortfin molly, <u>Poecilia mexicana</u>				2
Sailfin molly, <u>Poecilia latipinna</u>			1	3
Striped bass, <u>Morone saxatilis</u>	1	5	3	5
Smallmouth bass, <u>Micropterus dolomieu</u>	1	1	4	4
Largemouth bass, <u>Micropterus salmoides</u>	3	6	4	8
Warmouth, <u>Lepomis gulosus</u>			2	4
Green sunfish, <u>Lepomis cyanellus</u>	3	5	1	2

Table 2. Continued.

Species	River Segment			
	I	A	II B	C
Bluegill, <u>Lepomis macrochirus</u>	2	5	4	5
Redear sunfish, <u>Lepomis microlophus</u>		3	4	6
Black crappie, <u>Pomoxis nigromaculatus</u>	2	6	3	5
Mozambique mouthbrooder, <u>Sarotherodon mossambica</u>		1	1	
Zill's tilapia, <u>Tilapia zilli</u>				
Rio Grande killifish, <u>Fundulus zebrinus</u>				
<b><u>HYPOTHETICAL SPECIES</u></b>				
White surgeon, <u>Acipenser transmontanus</u>		2		
Mexican tetra, <u>Astyanax mexicanus</u>				1
Blue catfish, <u>Ictalurus furcatus</u>			1	
Brown bullhead, <u>Ictalurus nebulosus</u>		1	1	1
Walking catfish, <u>Clarius batrachus</u>				1
Guppy, <u>Poecilia reticulata</u>				1
Variable platyfish, <u>Xiphophorus variatus</u>				1
White bass, <u>Morone chrysops</u>				1
White crappie, <u>Pomoxis annularis</u>		1		
Yellow perch, <u>Perca flavescens</u>			1	
Spotted sleeper, <u>Eleotroptis picta</u>				2
Longjaw mudsucker, <u>Gillichthys mirabilis</u>				1
Mottled sculpin, <u>Cottus bairdi</u>		1		
Mountain sucker, <u>Catostomus platyrynchus</u>	1			

**Notes**

1 Endangered species (USDI, 1979)

2 Endangered species (CDFG, 1978)

Relative abundance of fishes sampled from Lee's Ferry to Diamond Creek is as follows: speckled dace are common to abundant; carp, flannelmouth sucker, and bluehead sucker are common; rainbow trout are common to rare; and humpback chub, fathead minnow, channel catfish, black bullhead, and Rio Grande killifish are rare (Holden and Stalnaker, 1975; Minckley and Blinn, 1975). All species except humpback chub and bonytail chub are found throughout this section. The latter two species are found near the Little Colorado River.

There are greater numbers of fish species and of individuals in reaches of the river with rocky substrate than with sandy substrate (Holden and Stalnaker, 1975). More species of introduced fish are found than native fish, but greater numbers of individuals of native fish are found (Johnson, 1977). Introduced species are competing with and putting pressure on the native species. Cold water from Glen Canyon Dam has decreased water temperatures in Marble Canyon and Grand Canyon so that spawning temperatures, especially for rare forms, seldom occur.

Three native fish species and two introduced species were observed from Diamond Creek to Pierce Ferry (Deacon and Baker, 1976). None are endangered or threatened species (USDI, 1979). Attempts to collect fish from the mainstream were not very successful, therefore more species of fish may be present than are indicated. Those species caught or observed in Spencer Canyon and in Surprise Canyon that may also enter the mainstream are fathead minnow, mosquitofish, green sunfish, Rio Grande killifish, largemouth bass, striped bass, and channel catfish (Deacon and Baker, 1976).

Three species of native fishes, nine species of introduced fishes, and one species of hypothetical fish are found in Lake Mead. Native fishes collected from Lake Mead include bonytail chub, and razorback sucker, although both species are extremely rare, based on studies by Arizona Game and Fish Department and Nevada Department of Wildlife.

The flannemouth sucker occurs above Lake Mead (Deacon and Baker, 1978; Holden and Stalnaker, 1975; Minckley and Blinn, 1976) and below (Minckley, 1976). The mountain sucker is listed as a hypothetical species because only one specimen caught in 1938 was recorded in the literature, it is used as a bait species in Lake Mead and could be introduced by escaping from anglers.

Three species of native fishes and seven species of introduced fishes are recorded from Hoover Dam to Davis Dam. Carp and bluegill are currently the most abundant. Largemouth bass also occur in this area. The razorback sucker is common in reaches of the river with a sandy bottom. Lake Mohave supports the largest known population of adult razorbacks in the lower Colorado River.

## SEGMENT 2. DAVIS DAM TO MEXICAN BORDER.

Subarea A. Davis Dam to Parker Dam. Four species of native fishes, eighteen species of introduced fishes, and four species of hypothetical fishes have been collected or observed from this subarea. Reproduction of the native razorback sucker has not been observed recently and they remain in the area only as large adults (Minckley, 1979). Bonytail chub are infrequently caught in Lake Havasu and one was caught by an angler below Davis Dam in 1979. White sturgeon were introduced in 1967, but their current status is unknown.

Threadfin shad, striped bass, rainbow trout, channel catfish and carp are all common in this portion of the river. Production of food organisms for fish in the littoral zone is poor because of fluctuations in water level that occur below Davis Dam (Kimsey, 1958). Dredging of the channel has also damaged fish habitats by eliminating riparian vegetation used as cover by fish, eliminating eddies and holes along the littoral zone, increasing bank erosion and turbidity, decreasing spawning areas, and draining backwaters (Beland, 1953).

The most desirable sport fishes north of Lake Havasu are rainbow trout and striped bass (Minckley, 1979). Rainbow trout are regularly planted below Davis Dam where cool, clear water is discharged. Striped bass were the most numerous fish in the channel in 1974. Their main food is threadfin shad, but they also eat rainbow trout, largemouth bass, green sunfish, carp, and crayfish. A critical habitat for striped bass occurs locally in this subarea

(Nevada Game and Fish Department, personal communication). Striped bass also frequent backwaters to seek prey species such as threadfin shad. Backwaters are in various degrees of succession accelerated by siltation. Vegetation encroachment has proceeded at about 7 m per year in some areas. Nearly all of the remaining viable backwaters have natural levees protecting them from the river with downstream openings where water enters after dumping most of its sediment load.

The sport fishery in Lake Havasu consists mainly of largemouth bass, channel catfish, striped bass, and black crappie (Minckley, 1979). Brush shelters and artificial reefs have been placed in Lake Havasu by the California Department of Fish and Game providing good cover for largemouth bass and other sunfishes (CDFG, personal communication). Largemouth bass habitat varies from good to poor in Lake Havasu depending on changes in turbidity and vegetation cover (Guenther and Romero, 1972; Romero, 1973). Ideal bass habitat is relatively clear water with good vegetative cover for young fish. When turbidity is high in Lake Havasu, as it frequently is in the Bill Williams arm, the habitat is good for channel catfish and carp. Channel catfish are the main sport fish in the Bill Williams arm of Lake Havasu (Guenther and Romero, 1972).

Subarea B. Parker Dam to Blythe. Four native species, twenty-two introduced species, and three hypothetical species of fishes have been recorded between Parker Dam and Blythe. Two native fishes, the Colorado squawfish and razorback sucker, are listed as endangered species by the California Department of Fish and Game (CDFG, 1978). Red shiners are the dominant species throughout most of this subarea, with threadfin shad most abundant near the middle of the segment (Minckley, 1979). Backwaters are dominated by red shiners and mosquito-fish. Sailfin molly, Zill's tilapia, and striped mullet are rare. All three fishes were observed in 1973. Previously, the northern extent of their range had been Imperial Dam about 140 km south of where they were sighted in 1973.

Fishing pressure is very high between Parker Dam and Headgate Rock Dam (Minckley, 1979). This reach of the river is a very popular recreation area for boating and swimming as well as fishing (Jensen *et al.*, 1975). Commercial and residential development is extensive and there is easy access to the river. Non-angling use of the river, such as boating and swimming, limits angling pressure, but dense human population and easy river access provides for more angling pressure than the central and southern portions of this section. Smaller sunfishes, largemouth bass, yellow bullhead, channel catfish, and numerous carp are caught from Parker Dam to Headgate Rock Dam. Threadfin shad and red shiners are abundant in the tailrace of Parker Dam.

The sport fishery in the central portion below Headgate Rock Dam consists mainly of channel catfish, but largemouth bass, bluegill, black crappies, and a few redear sunfish and yellow bullhead are also caught (Minckley, 1979). This reach of the river is within the Colorado River Indian Reservation (Jensen *et al.*, 1975). Commercial development has been slower than upstream just below Parker Dam, and river access is limited. Further, fewer pleasure boaters and water skiers are present. For these reasons, fishing is more desirable in this area but pressure is less than that upstream near Parker

Dam. Several backwaters and connecting lakes add to the fishery. Catchable rainbow trout are planted each winter, mainly in the backwater lakes on the Arizona side of the river.

Subarea C. Blythe to Mexican Border. The area between Blythe and the Mexican Border supports more species of fishes than any other river segment discussed in this report. Nine species of native fishes, twenty-three species of introduced fishes, and eight species of hypothetical fishes have been reported. The red shiner is by far the most abundant fish in the channel in the section (Minckley, 1975 and 1979). Other fishes occurring in abundance in the channel were bluegill, mosquitofish, largemouth bass, redear sunfish, sailfin molly, and mouthbreeders. The red shiner prefers flowing water and is generally most common in the channel. However, mosquitofish, bluegill, sailfin molly, green sunfish, redear sunfish, and largemouth bass are usually more abundant in backwaters than red shiners.

Fishes are distributed in the channel and backwaters according to their habitat preference. Red shiners are more common in the mainstream. Mosquitofish and sailfin molly are abundant along the bank; juvenile mouthbreeders are found in quiet, densely vegetated areas. The centrarchids (bluegills, sunfishes, bass) prefer deep, open backwaters; warmouth are found in stands of cattails and sedges; and small schools of treadfin shad are most common in quiet waters with no vegetation (Minckley, 1979).

Hunter's Hole is a backwater in the southern end of Segment 2 that supports a productive fishery. Dominant fishes in Hunter's Hole are mullet, threadfin shad, and carp (Minckley and McNatt, n.d.). Diversity of species is high, but there is a lack of lower trophic levels of the food web that support juvenile game fish such as largemouth bass and black crappie.

#### Aquatic Vegetation

SEGMENT 1. LEE'S FERRY TO DAVIS DAM. The Colorado River in the Grand Canyon supports a highly diverse periphytic micorfloral community indicating a relatively young and unspoiled environment. Over 345 taxa have been recorded, of which diatoms were most abundant (244 taxa); followed by blue-green algae (83 taxa), green algae (34 taxa), yellow-green algae (3 taxa), and red algae (1 taxon). Slow moving waters, variable flow characteristics, and increasing levels of suspended materials downstream through the Grand Canyon are major environmental factors affecting the flora (Czarnecki et al, 1976).

Based on numbers of phytoplankton organisms, Segment 1 can be characterized as being relatively unproductive (Sommerfeld et al, 1976). The phytoplankton population is diverse but sparse and decreases with distance downstream.

Seventy-nine species of phytoplankton have been identified from Lake Mead (Staker et al, 1974). The number of species in each algal division are as follows: 42 Bacillariophyta (diatoms), 18 Chlorophyta (green algae), 9 Cyanophyta (blue-green algae), 3 Chrysophyta (golden-brown algae), 3 Cryptophyta, 2 Pyrrophyta, and 2 Euglenophyta. Green algae are dominant in

the spring; green algae, Cryptophyta, and golden-brown algae dominate in early summer; blue-green algae are dominant in the late summer and fall; and green algae, diatoms, and Cryptophyta dominate in the winter.

Upper Lake Mead is oligotrophic, Boulder Basin is mesotrophic, and Las Vegas Bay is mesotrophic to eutrophic. (Prentki et al, 1981).

Vegetation from Hoover Dam to Davis Dam consists mainly of algae covering rock and gravel substrates (Bryant, 1977; Moffett, 1942). Five genera of periphyton dominate the benthic flora: Cladophora, Cymbella, Melosira, Oscillatoria, and Diatoma (Bryant, 1977). The phytoplankton is dominated by Cladophora, Cymbella, Melosira, Oscillatoria, and Diatoma, the same genera that dominate the bottom algal community, plus Navicula (Bryant, 1977; Appendix A of the EIS by Priscu, 1976).

## SEGMENT 2: DAVIS DAM TO THE MEXICAN BORDER.

Subarea A. Davis Dam to Parker Dam. Emergent aquatic vegetation in the upper reaches consists mainly of cattails, sedges, and some sparse water-pennywort (Minckley, 1979). Major submergent aquatic vegetation are sago pondweed (Potamogeton natans), coontail (Ceratophyllum demersum), and small beds of spiny naiad (Najas sp.). Macroscopic algae present are Cladophora, especially in shallow water with hard substrates and high insolation, Rhizophora, films of diatoms, and some mats of blue-green algae.

In the middle reaches emergent aquatic vegetation is rare in the mainstream because neither stony bottoms in the upper areas nor shifting sand in the lower areas allow for rooting of vegetation (Minckley, 1979). The most conspicuous algae in the channel are thin beds of Cladophora. Some boulder and cobble bottoms support encrusting blue-green algae and diatoms. Sedges (Scirpus spp.), cattails (Typha latifolia), and giant African reeds (Phragmites maximus) are present in backwaters and inlets. Backwaters also contain sago pondweed, coontail, spiny naiad, and thick diatom mats.

Attached aquatic vegetation is very rare in Lake Havasu (Minckley, 1979). Sparse, seasonal stands of coontail, pondweeds, Chara sp., spiny naiad, and a few others are present in protected shoreline areas (Guenther and Romero, 1972; Minckley, 1979). Extensive beds of cattails are present locally, especially in the Bill Williams River delta. Attached algae is rare but has been found on boulders and other solid substrates (Minckley, 1979).

Phytoplankton assemblages in Lake Havasu are quite different from assemblages in more northerly reaches of the Colorado River. Dinoflagellates and long filamentous blue-green algae dominate the planktonic biota in Lake Havasu (Evertt, 1970). Planktonic diatoms and small blue-green algae are not present.

Subarea B. Parker Dam to Blythe. Vegetation in this subarea is abundant and diverse throughout most of the area (Minckley, 1979). Cattails and sedges characterize the emergent aquatic vegetation, with some giant African reeds in the southern reaches of the segment. Sago pondweed, coontail, Chara sp., and spiny naiad, are found in backwaters and sloughs. Submergent vegetation

(pondweed, coontail, *Chara* sp.) is found associated with emergent vegetation in the mainstream where roots of the latter stabilized bottom materials.

Subarea C. Blythe to the Mexican Border. Emergent aquatic vegetation in this reach consists mainly of cattails, sedges, and giant African reeds that sometimes grow as high as 5 m (Minckley, 1975 and 1979). Spiny naiad and sago are the most abundant submergent vegetation in the channel and backwaters. High TDS concentrations in backwaters which receive agricultural drainage increases the production of the halophytic (salt-tolerant) spiny naiad, which frequently grows so thick that boat navigation is difficult. Films and mats of blue-green algae and diatoms are common on solid substrates such as rip-rap and logs in the channel, and in shallow water on silty bottoms in backwaters (Minckley, 1979).

#### Infauna

SEGMENT 1. LEE'S FERRY TO DAVIS DAM. The Colorado River above Davis Dam is unproductive in benthic invertebrate fauna except for a minor reach near Lee's Ferry. The mainstream and tributaries are very different in faunal composition except for the overlap of oligochaetes, chironomids, and gastropods. Edges of the mainstream and backwaters support a more diverse infauna than the center of the channel. In the reach above Hoover Dam, organisms consist mainly of combinations of the amphipod *Gammarus lacustris*, chironomid larvae, ostracods, oligochaetes, and snails (Cole and Kubly, 1976). Infauna from Hoover Dam to Davis Dam consists mainly of oligochaete worms and amphipods (Bryant, 1977). Amphipods are associated with microscopic algae and submergent vegetation. Snails and insect larvae are the next most common invertebrates. Benthic invertebrates are found mainly in shallow rubble areas and areas with silt and detritus on the bottom. Very few organisms are found on sandy bottoms.

SEGMENT 2. DAVIS DAM TO THE MEXICAN BORDER. Benthic infauna is highly diverse between Davis Dam and 10 km below the dam (Minckley, 1979). The high diversity is a result of hard substrates that provide good anchorage and cover for invertebrates, and hypolimnic discharge from Lake Mohave that is cool, fast-flowing, and rich in particulate matter such as plankton. Filter feeders are the most common organisms in this reach.

At 10 km below Davis Dam, the substrate changes to a silt-sand bottom (Minckley, 1979). Both species diversity and numbers of organisms decreases and dominance shifts to oligochaete worms and chironomid dipteran larvae, both of which are uncommon on coarser bottoms. Substrates of shifting sand are devoid of organisms. Backwaters contain seven invertebrate taxa, the Asiatic clam being dominant. Oligochaetes and chironomids dominate when Asiatic clams are excluded from the tally.

Diversity of infaunal species remains low through Topock Gorge in the middle of Subarea A (Minckley, 1979). Asiatic clams are present and share dominance with oligochaete worms and chironomid dipteran larvae. Species and numbers in backwaters of this reach are the same as in the channel.

Dominance of Asiatic clams, oligochaete worms, and chironomid dipteran larvae continues throughout Lake Havasu (Minckley, 1979). Abundance of oligochaete worms is inversely related to numbers of chironomid dipteran larvae. Asiatic clams are found mainly on rock or gravel substrates (Guenther, 1972). They are edible and are occasionally used for bait by fishermen, but are basically an untapped resource.

The Asiatic clam is the most abundant invertebrate infaunal organism between Parker Dam and Headgate Rock Dam (Minckley, 1979). Chironomids and oligochaetes, as well as Asiatic clams, dominate the infauna of backwaters. Species diversity, numbers of organisms, and biomass are low.

Diversity, numbers of organisms, and biomass increases immediately below Headgate Rock Dam (Minckley, 1979). The Asiatic clam is still dominant by numbers and weight, but simuliid dipterans and baetid ephemeropterans are also relatively abundant. Farther south, invertebrate fauna characteristic of flowing water and coarse bottom sediments are found: simuliid and tabanid dipterans; hydrophilid beetles; and an introduced snail, *Radix* sp., are major components of the biomass. Chironomids and oligochaetes are also present.

Proceeding downstream, a rapid decrease in diversity of infauna occurs until only four taxa are present at the Palo Verde Irrigation Diversion. Biomass is high, however, due to the presence of the Asiatic clam.

Infauna is sparse or moderately abundant throughout the channel between Blythe and the Mexican Border (Minckley, 1979). Asiatic clams dominate by biomass, and chironomid dipteran larvae and oligochaete worms dominate by numbers. Asiatic clams are absent on bottoms of highly organic materials, but are numerous along coarser bottoms where water current is greater.

Asiatic clams are present in nearly all of the backwaters between Blythe and the Mexican Border (Ponder, 1975). Other invertebrates found in low numbers are coleopterans and physid snails. Hunter's Hole is more productive than other backwaters. A few large Asiatic clams in shallow water dominate the infauna in this area by weight (Minckley, 1979). Other species present are dragonfly and damselfly naiads and adults, larval and adult true flies, blood worms, and oligochaetes (Minckley and McNatt, n.d.).

#### TERRESTRIAL AND WETLAND BIOLOGY

The Colorado River from Lee's Ferry to the Mexican Border contains diverse and valuable biological resources. The presence of these resources is remarkable when it is considered that a majority of the study area has been heavily disturbed by construction of dams, channelization, dredging, and other man-caused and natural disturbances.

Riparian woodland and marshland are the prominent vegetation type along the lower Colorado. This vegetation serves as prime habitat for numerous avian species including egrets, herons, dove, quail, numerous waterfowl species, and raptors. The importance of migrating waterfowl is further enhanced because the Colorado River is a major portion of the Pacific Flyway, serving as over-wintering habitat.



The Colorado River area also supports a diverse assemblage of reptiles, amphibians, and mammals. Appendixes B-1 through B-4 of the EIS list the major species of plants, mammals, birds, reptiles and amphibians that occur along the lower Colorado.

### Vegetation

**SEGMENT 1. LEE'S FERRY TO DAVIS DAM.** A riparian community characterized by salt cedar (Tamarix chinensis), arrowweed (Pluchea sericea), coyote willow (Salix exigua), desert broom (Baccharis sarothroides), and seep willow (Baccharis glutinosa) comprises the majority of terrestrial vegetative interface with the aquatic habitat between Lee's Ferry and Grand Wash Cliffs. Marshlands are present throughout this region and are characterized by cattail (Typha latifolia) and horsetail (Equisetum spp.). In many areas a cliff or rock interfaces with aquatic habitat. These areas are essentially devoid of vegetation. Virtually no desert scrub habitat occurs contiguous with the shoreline (Carothers et al. 1976).

Two new species were described for the Grand Canyon, by Carothers et al. (1976); Flaveria mcdougalli in Cove Canyon and Matkatamiba Canyon; and a new species of Euphorbia in upper Marble canyon. Inasmuch as both are new to science and only known from these locations, they should be considered sensitive.

The vast majority of shoreline between Grand Wash Cliffs and Davis Dam forms the shore of Lakes Mead and Mohave and the vegetation interface is primarily desert scrub dominated by creosote bush (Larrea tridentata), bursage (Ambrosia dumosa), brittlebush (Encelia farinosa), cheeseweed (Hymenoclea salsola), and sweetbush (Bebbia juncea) (Holland, et al., 1979; Table B-1). In wash areas that reach the shoreline there is generally a small band of salt cedar either in pure stands or mixed with catclaw (Acacia greggii) or mesquite (Prosopis spp.). Even in extremely large washes the actual area covered by this vegetation is small. A small percentage of lake shoreline contains large stands of salt cedar.

There are several species of sensitive plants that may be found near the shoreline at the confluence of the Virgin and Muddy Rivers and the upper portion of the Overton Arm of Lake Mead: Wild Buckwheat (Eriogonum viscidulum), and milkvetch (Astragalus nyensis, and A. geyeri triquetrus) (Holland et al., 1980).

**SEGMENT 2. DAVIS DAM TO THE MEXICAN BORDER.** Vegetation along this portion of the Colorado River can be categorized into four general communities: Riparian Woodland, Marshes, Desert Scrub, and developed areas. Each category is discussed below.

**Riparian Woodland.** Several associations within this community occur below Davis Dam. These are as follows:

1. **Cottonwood/Willow Habitat** This habitat is the least common of the riparian associations and consists primarily of cottonwood (Populus fremontii) and willow (Salix goodingii). This community is dense with at least 20 percent of the total vegetation consisting of trees.

2. Honey Mesquite Habitat - Many areas in this association contain almost pure stands of honey mesquite (Prosopis velutina). However, in some areas the introduced salt cedar has invaded this association in sufficient numbers to form a honey mesquite/salt cedar mix association.

3. Screwbean Mesquite Habitat - Few, if any, pure stands of screwbean mesquite (Prosopis pubescens) exist within the study area. However, a salt cedar/screwbean mesquite mix community occurs throughout the study area.

4. Salt Cedar Habitat - Many areas have been invaded by salt cedar. This Eurasian introduced species outcompetes most native riparian species and has substantially contributed to the decline of native species within the area. This species has been instrumental in changing the character of much of the riparian area along the Colorado River.

5. Arrowweed Habitat - Areas containing dense stands of arrowweed (Pluchea sericea) occur in scattered portions throughout the study area.

Marshes. Marshes are distributed throughout this stretch of the river. Based on field observations, these marshes generally are of two types: inchannel marshes and marshes adjacent to the river, but out of the main channel. In channel marshes generally occur in areas where currents have produced a high degree of siltation. These marshes contain sedges, tules, and cattails. Below Blythe Phragmites becomes a dominant marsh emergent. Distributed primarily on the western bank of the river, these marshes are generally less than 20 acres in size and may appear or disappear rather quickly depending upon currents and siltation rates. Other marshes located off the main channel are generally more extensive and permanent, containing dense tules, cattails, and sedges. Major marshes in this segment include Topock marsh, the upper end of Lake Havasu, and Imperial Wildlife Refuge.

Desert Scrub. Along some portions of river (i.e., Lake Havasu, Topock Gorge) riparian vegetation is not well developed and desert scrub is distributed almost to the water's edge. Vegetation within these areas varies between creosote scrub, with creosote bush and burrobrush (Hymenoclea sp.) dominant, to wash vegetation containing Palo Verde (Cercidium floridum), cat claw and smoke tree (Dalea spinosa). Some rocky areas are essentially devoid of vegetation.

Developed Areas. Significant portions of the study area contain areas disturbed by agricultural development or by recreational development. Most native vegetation within these areas has been removed, although field investigations indicate that some vestiges (i.e., cottonwood and mesquite) of riparian vegetation remain. Some areas developed into agriculture (e.g., Colorado River Indian Reservation) have buffer strip of riparian vegetation between agricultural fields and the river.

Sensitive Plant Species. Three species listed as sensitive by the California Desert Plan (BLM, 1980) may occur in the Desert Scrub habitat within this section of river. Coryphantha vivipara var. alversonii, a candidate threatened species occurs in the Parker Dam and Vidal Wash areas (RM 17 to 192). California Ditaxis, (Ditaxis californica), another candidate

species was found by the BLM in one location immediately south of Blythe. This species would have the potential to occur within the Desert Scrub habitat from Blythe to the Mexican Border. A species of special concern, Opuntia wigginsii may occur in the portion of the river next to the Picacho Mountain (RM 66 to 77). Polygonum fusiforme, a candidate species for threatened or endangered classification (Federal Register, December 15, 1980, p. 82532), is found near Topock and Yuma.

## Wildlife

### AVIAN SPECIES

Segment 1. Lee's Ferry to Davis Dam. Avian species diversity is high due to the presence of aquatic and riparian habitats. Of the 41 breeding species, 74 percent are either restricted to or prefer the riparian habitat (Carothers et al, 1976). Three federally listed endangered species are known to utilize the Colorado River area: the Southern Bald Eagle (Haliaeetus leucocephalus), Brown Pelican (Pelecanus occidentalis), and Peregrine Falcon (Falco peregrinus) (Johnson et al, 1977). The latter species is a permanent resident of the area (Carothers and Sharber, 1976). Three species of State (Arizona) listed birds periodically utilize the area: Snowy Egret (Egretta thula), Black-crowned Night Heron (Nycticorax nycticorax), and Osprey (Pandion haliaetus) (Johnson, 1976; Blake, 1978; Brown et al, 1978).

Segment 2. Davis Dam to the Mexican Border. In addition to the large number of migratory waterfowl that utilize the area, this segment of the river provides significant habitat area for terrestrial and shorebirds. Appendix B-3 of the EIS lists birds species by preferred habitat type.

Several species occurring within this portion of the river are considered sensitive. The Yuma Clapper Rail (Rallus longirostris yumanensis) is listed as endangered by the U.S. Fish and Wildlife Service, rare by the State of California, and threatened by the State of Arizona. This species nests and feeds primarily in marshes containing dense tules or cattails. Studies by Gould (1975) indicate that this secretive species ranges in marshland from Topock Marsh to the International border. Additionally, the entire river south of Davis Dam should be considered as a migratory corridor for the species. The Black Rail (Laterallus jamaicensis coturniculus), a species listed as rare by the State of California and threatened by the State of Arizona, occurs in the southern portion of the study area with major populations from Ferguson Lake to Laguna Dam. Habitat requirement of this species are similar to that of the Yuma Clapper Rail. The Bell's Vireo (Vireo bellii) and the California Yellow-billed Cuckoo (Coccyzus americanus occidentalis), listed as endangered and rare respectively by the State of California, frequent riparian areas along the entire study area. The State of California has listed the Elf Owl (Micrathene whitneyi) as endangered (Cardiff, 1978). Two locations within California (17 miles north of Needles: 33 miles north of Blythe) have been recorded for this species. Additional sites are also probable on the Arizona side of the river.

1. It is known whether the subspecies of Bell's vireo occurring along the Colorado River is the least or Arizona Bell's vireo. The Arizona Bell's vireo has no endangered status. The least Bell's vireo is a candidate species for federal listing.

The endangered Southern Bald Eagle and Peregrine Falcon could range within this area. A nesting pair of Southern Bald Eagles have been observed with Havasu National Wildlife Refuge. This section of the river contains a number of sensitive raptor species including Prairie Falcon (Falco mexicanus), Marsh Hawk (Circus cyaneus), Burrowing Owl (Speotyto cunicularia), and Osprey.

#### MAMMALS.

Segment 1. Lee's Ferry to Davis Dam. Mammalian species composition is typical of the Mojave Desert of southern Nevada and northern Arizona. Species diversity is moderate and productivity is high for small mammals of undisturbed desert scrub habitats along Lake Mohave and the Colorado River below Davis Dam. Shoreline populations tended to be less stable, less productive, and yet slightly more diverse than adjacent terrace populations. The canyon mouse (Peromyscus crinitus) was judged to be the most successful small mammal in the riparian habitat in the Grand Canyon area; while in the Lake Mead Recreational area, the cactus mouse (Peromyscus eremicus) is the major species of small mammal. Opportunistic scavengers such as ringtail cat (Bassariscus astutus) and western spotted skunk (Spilogale gracilis) tend to occur in high concentrations near established campsites in the Grand Canyon National Park. Mule deer (Odocoileus hemionus) and desert bighorn (Ovis canadensis) occur through the area and utilize shoreline areas for foraging and watering sites. Sensitive species that are known to occur along the river are state (Arizona and California) listed desert bighorn sheep (Ovis canadensis) and river otter (Lutra canadensis).

Segment 2. Davis Dam to the Mexican Border. Cactus mice are the most abundant species within riparian areas between Davis Dam and the Mexican Border. Desert cottontails (Sylvilagus audubonii) were particularly abundant in riparian areas bordered by agricultural areas. Other larger mammalian species within the area include coyote (Canis latrans), spotted and striped skunk (Spilogale gracilis) and (Mephitis mephitis) and grey fox (Urocyon cinereoargenteus). Mountain lion (Felis concolor) and bobcat (Lynx rufus) may occur in less developed areas. Larger game species within the area is limited to mule deer which occurs in significant numbers throughout the area, with high numbers in the riparian habitats (Anderson and Ohmart, 1976).

Desert bighorn sheep generally ranges throughout much of the study area. Habitat areas noted by the BLM (1980) included the Chemehuevi Mountains, Big Maria Mountains, and much of the area south of Blythe (generally within the mountainous areas, both in California and Arizona). The sheep use the Colorado River primarily as a watering spot.

#### REPTILES AND AMPHIBIANS.

Segment 1. Lee's Ferry to Davis Dam. Major species encountered include the side-blotched lizard (Uta stansburiana), tree lizard (Urosaurus ornatus), and desert spiny lizard (Sceloporus magister). No sensitive species were identified (Tomko, 1976 a and b).

Segment 2. Davis Dam to the Mexican Border. In general, reptiles occur at lesser densities within riparian and marsh habitats than within desert scrub upland habitats. Long-tailed brush lizards (Urosaurus graciosus) and to a lesser extent, desert spiny lizards are arboreal and use the riparian habitat to a greater extent than other species. The coachwhip (Masticophis flagellum) and the western diamondback (Crotalus atrox) are the most abundant snakes along the river. The introduced bullfrog (Rana catesbiana) occurs at high densities within the river and associated backwaters. Woodhouse's toad (Bufo woodhousei) occurs at high densities in agricultural areas, and the western spadefoot toad (Scaphiopus couchi) is abundant in desert scrub (Vitt and Ohmart, 1978).

The three reptile species occur within desert scrub areas that should be considered sensitive.

The desert tortoise (Gopherus agassizii) is a BLM designated sensitive species, occurring within desert scrub habitats in varying densities. Its decline is both from illegal collection and habitat destruction. Based on analysis of available data, no areas of high tortoise density occur directly adjacent to the river.

The gila monster (Heloderma suspectum) is a State of Arizona listed threatened species occurring in desert scrub/desert wash habitats. The flat-tailed horned lizard (Phrynosoma m'callii) occurs in sand dune habitats in the desert scrub. This species is listed as a sensitive species by the BLM and is proposed for listing as a threatened species by the U.S. Fish and Wildlife Service.

## AIR QUALITY

### Meteorology/Climatology

The climate of the Colorado River basin, as with much of the southwestern United States, is largely controlled by the strength and position of the semi-permanent subtropical high pressure cell over the Pacific Ocean and complex topography of California, Arizona, and Nevada. The climate of the study area is characterized by considerable homogeneity throughout the lower river elevations, commencing from approximately Hoover Dam to the Mexican Border. These arid regions of the river experience the hottest and driest weather throughout the contiguous United States. The semiarid upper regions, because of the sharp terrain relief and higher elevation, have an extremely varied and considerably more comfortable summer climate with correspondingly colder winters. In the Koppen climatic classification scheme, the region below Hoover Dam has a BWh (tropical and subtropical desert) climate while the higher elevations have a BSk (mid-latitude steppe) type climate.

As shown in Table 3, temperatures along the river generally decrease about 3.5F for every 1,000 ft of elevation increase. Mean temperatures at Yuma are 72F; at the Grand Canyon the annual mean drops to 49F. The temperature distribution from Yuma to Davis Dam is rather uniform with similar means and extremes, but temperatures drop considerably as the river gains in elevation through Arizona.

Table 3. Climatic Parameters Along the Colorado River

WINTER

River Segment	Elevation (ft)	Data Stations	Temperature Of Mean Max	Mean Min	Days F32F	Precipitation (in)	Snowfall	Winds f kts Days
1	6,611	Grand Canyon	43	20	82	4.78	--	--
2	2,458	Boulder City	55	40	11	1.85	2.5	21.2
3	990	Needles	65	42	8	1.55	1.3	21.2
4	425	Parker	69	35	14	1.92	--	--
5	397	Blythe	69	42	6	1.11	0.0	19.4
5	213	Yuma	69	44	2	1.30	0.0	6.8

SUMMER

River Segment	Elevation (ft)	Data Stations	Temperature Of Mean Max	Mean Min	Days F32F	Precipitation (in)	Snowfall*	Winds f kts Days
1	6,611	Grand Canyon	82	51	9	4.65	--	--
2	2,458	Boulder City	99	74	83	1.23	11.5	28.8
3	990	Needles	105	79	90	1.25	8.4	13.2
4	425	Parker	106	72	92	1.07	--	--
5	397	Blythe	106	77	91	1.06	5.8	13.3
5	213	Yuma	104	74	91	0.83	7.0	10.6

\*Snowfall values are obtained from high elevation areas during winter months.

Precipitation is very light throughout the desert areas of the southwest. Whereas temperature decreases with height, rainfall increases. Rainfall has two distinct seasonal maxima. Light rains fall from weak winter storms that have lost most of their moisture in crossing the coastal ranges and the Sierra Nevada before reaching the river. Two or three storms per month may reach the areas in summer; a moisture influx from tropical waters in the Gulf of California or Mexico creates strong convective activity that creates two or three thunderstorms during the summer. While the summer storms are more infrequent, their much heavier rainfall often creates dangerous flashflood situations. As seen in Table 3, summer and winter rains (snow at higher elevations in winter) for each river segment are almost balanced in terms of total seasonal precipitation.

Winds along the river generally have moderate speeds favorable for good pollutant dispersion without creating dangerous wind situations. Strong winter winds are driven by the pressure patterns from periodic storms--summer winds result mainly from intense differential heating and cooling of land and water and of different terrain exposures. Prevailing winds along the river follow the river topography with winds predominantly from the south in summer and from the north in winter. Pressure driven circulations are usually from the west or northwest such that many river sites have three prevailing wind directions. While there is considerable diversity in wind directions and only a low frequency of high winds that may endanger river use, there is correspondingly only a low frequency of calm winds conducive to pollution stagnation. Calm winds occur in conjunction with reversals of diurnal upslope/downslope or onshore/offshore winds, but these reversals usually occur early in the morning or late in the evening during times of minimum recreational activity on the river.

In addition to the favorable wind conditions, atmospheric stability is also well structured for good daytime ventilation. Surface-based radiation inversions form on cool, calm nights that restrict dispersion, but these dissipate soon after sunrise. The low-level marine and subsidence inversions that form along the California coastline causing serious air quality problems do not form over the study area. If such inversions form, they occur at 6,000-8,000 feet above the surface and, therefore, do not hinder the pollutant dispersal process.

#### Ambient Air Quality

Regional air quality is influenced by the total emission of primary pollutants and the generation of secondary pollutants throughout the air basin. A spatial and temporal variation in regional air quality occurs as a result of the spatial distribution of sources, meteorology, and topography in the Colorado River air basin. Overall, the existing air quality levels along the river are very good.

The Clean Air Act of 1970 and its amendments of 1977 delegated to the Environmental Protection Agency (EPA) the responsibility of establishing national ambient air quality standards (AAQS) and policies to attain and maintain these standards. The EPA promulgated ambient air quality standards for concentrations of six pollutant species (or criteria pollutants), allowing

individual states to retain the option to establish more stringent standards or incorporate additional contaminants. Arizona and Nevada have generally adopted the federal AAQS, whereas California, because of serious air quality problems in its coastal areas, has developed additional standards to accelerate the attainment goals. The air quality standards currently applicable to the study area, both the national AAQS and the California laws, are shown in Table 4.

The majority of air quality monitoring stations along the Colorado River are sponsored or supervised by the state of Arizona Department of Health Service, Bureau of Air Quality Control. Because the density of monitoring locations is often dictated by the population density in order to define characteristic receptor exposure, the level of monitoring along the river is somewhat limited. Except for two major point sources, the Navajo power plant near Page, Arizona (Segment 1) and the Mohave power plant near Bullhead City, Arizona (Segment 2, Subarea A.), ambient air quality along the river is generally very healthful and in conformance with EPA's attainment standards. The state of Arizona Bureau of Air Quality Control considers the power plants as attainment areas as they rarely exceed the standards except for an occasional 24-hour period; the EPA, however, classifies the areas as non-attainment.

The study area experiences no violations of gaseous emissions; however, total suspended particulates (TSP) levels are of major concern in the dry desert climate. Localized sources of fugitive dust resulting from the lack of soil and atmospheric moisture are prevalent in areas of agricultural activity and off-road or unimproved roadway vehicle use.

As shown in Table 5, the distribution of ambient particulate levels indicate a gradual increase in dust levels as the river flows south to more urbanized and arid locations. Based on the annual geometric mean concentrations of  $60 \text{ g/m}^3$  for California standards and  $75 \text{ g/m}^3$  for national primary standards, areas such as Bullhead City, Topock, Needles, Parker, and Yuma are frequently in excess of the applicable standards for TSP levels. This deterioration results primarily from the decrease in rainfall as the river progresses south and the increase in soil disturbance from agricultural operations along the California-Arizona border. Yuma reportedly has the highest concentrations of TSP of any point along the river. As all other air pollutant parameters are in compliance with federal standards, the EPA has established a Rural Fugitive Dust Policy in order to recognize attainment for these areas. The policy states that rural areas with a population of less than 50,000 and containing no major point sources may be considered as meeting the attainment objectives.

There does not seem to be a significant correlation between particulate air quality and recreational use of the river because, in general, water-oriented recreational uses do not create desert soil disturbances. If river users are also active on public desert lands such as extensive off-road vehicle use, then there may be a noticeable air quality impact. For water-oriented use, however, there does not seem to be any clear-cut correlation between level of use and air quality.



Table 4. Ambient Air Quality Standards Applicable in California

Pollutant	Averaging Time	California Standards	Federal Standards	
		Concentration	Primary	Secondary
Photochemical Oxidants (Measured as Ozone)	1 Hour	0.10 ppm (200 $\mu\text{g}/\text{m}^3$ )	235 $\mu\text{g}/\text{m}^3$ (0.12 ppm)	Same as Primary Standard
Carbon Monoxide	12 Hours	10 ppm (11 $\text{mg}/\text{m}^3$ )	---	Same as Primary Standard
	8 Hours	---	10 $\text{mg}/\text{m}^3$ (9 ppm)	
	1 Hour	40 ppm (46 $\text{mg}/\text{m}^3$ )	40 $\text{mg}/\text{m}^3$ (35 ppm)	
Nitrogen Dioxide	Annual Average	---	100 $\mu\text{g}/\text{m}^3$ (0.05 ppm)	Same as Primary Standard
	1 Hour	0.25 ppm (470 $\mu\text{g}/\text{m}^3$ )	---	---
Sulfur Dioxide	Annual Average	---	80 $\mu\text{g}/\text{m}^3$ (0.03 ppm)	---
	24 Hours	0.05 ppm in comb. w/ 0.10 ppm Ox or 100 $\mu\text{g}/\text{m}^3$ TSP	365 $\mu\text{g}/\text{m}^3$ (0.14 ppm)	---
	3 Hours	---	---	1300 $\mu\text{g}/\text{m}^3$ (0.5 ppm)
	1 Hour	0.5 ppm (1310 $\mu\text{g}/\text{m}^3$ )	---	---
Suspended Particulate Matter	Annual Geometric Mean	60 $\mu\text{g}/\text{m}^3$	75 $\mu\text{g}/\text{m}^3$	60 $\mu\text{g}/\text{m}^3$
	24 Hours	100 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$
Lead (Particulate)	30-Day Average	1.5 $\mu\text{g}/\text{m}^3$	1.5 $\mu\text{g}/\text{m}^3$	Same as Primary Standard
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu\text{g}/\text{m}^3$ )	---	---
Hydrocarbons (Corrected for Methane)	3 Hours (6-9 a.m.)	---	160 $\mu\text{g}/\text{m}^3$ (0.24 ppm)	Same as Primary Standard
Ethylene	8 Hours	0.1 ppm	---	---
	1 Hour	0.5 ppm	---	---
Visibility-Reducing Particles	1 observation	In sufficient amount to reduce the prevailing visibility to 10 miles when the relative humidity is less than 70%	---	---

ppm - parts per million  
 pptm - parts per ten million  
 pphm - parts per hundred million  
 $\mu\text{g}/\text{m}^3$  - micrograms per cubic meter

Table 5. Particulate Data Along the Colorado River  
(g/m<sup>3</sup>)

	1977 *AGM	1976 *AGM	1975 *AGM
<u>Segment I</u>			
Lee's Ferry	36	18	ND
Page	35	ND	ND
Page Airport I	37	47	41
Page Airport II	ND	41	44
Grand Canyon	18	14	14
<u>Segment II</u>			
Kingman	51	56	57
Bullhead City	83	99	82
Davis Dam I	23	26	42
Davis Dam II	25	58	ND
Davis Dam III	25	38	37
Katherine's Landing I	44	55	45
Katherine's Landing II	28	35	40
Riviera I	32	43	44
Riviera II	43	64	175
Riviera III	56	93	ND
<u>Segment III</u>			
Lake Havasu	44	37	42
Topock	91	163	ND
Needles	124	ND	ND
<u>Segment IV</u>			
Parker	119	ND	ND
<u>Segment V</u>			
Yuma	133	142	147

\* AGM = Annual Geometric Mean

ND = No Data Available

In conclusion, the overall ambient air quality of the Colorado River region is exceptionally good; however, certain areas in the lower reaches of the river experience high particulate levels due to fugitive dust sources.

A major policy for which EPA has primary responsibility is the Prevention of Significant Deterioration (PSD). PSD regulations are intended to prevent the degradation of air quality in areas, such as the Colorado River, which currently attain national standards. The allowable decrease in air quality is based upon the area's PSD classification. National Parks and wilderness areas, such as the Grand Canyon National Park, are designated as Class I areas, in which only small incremental increases in sulfur dioxide and TSP concentrations would be allowed. The remaining river segments are designated as Class II, allowing for moderate increases, although not up to the prevailing state and national standards.

## CULTURAL AND HISTORICAL RESOURCES

### Historical Resources

The lower Colorado River has been the scene of significant events in human history for at least 7,000 years. This early occupation was by groups of people engaged in a mixed foraging economy who adapted to life along the river. These Desert Tradition peoples slowly gave way to the Patayan peoples who practiced agriculture and possessed pottery. These people persisted up until historic contact times when they came to be known as the Cocopah, Quechan, Halchidhoma, Mohave, Walapai, and Havasupai. Many of these groups still live along the river in their traditional lands.

European exploration of the Colorado River began in 1540 with the expedition of Alarcon. A major barrier to westward travel, the Colorado necessitated crossings for trails from Mexico and the East. River crossings, mining, agriculture, and trade slowly became major economic activities along the river. Many of the early towns have persisted to the present, having remained major river crossings as well as centers for agriculture (a major economic pursuit along the river today). With construction of numerous dams and levees, flooding was controlled, allowing significant recreational development around the man-made lakes.

Historic sites, structures, and properties associated with these events and trends are to be found along the lower Colorado River today. A total of 130 historic sites have been identified along the river, these include 38 archeological sites and 92 historic period sites.

**SEGMENT 1. LEE'S FERRY TO DAVIS DAM.** The area above Davis Dam contains 22 identified historic resources. All but one of these date to historic period occupation. These are predominantly river crossings, ferries, and bridges. Two of these sites, Hoover Dam and Grand Wash Archeological District, are listed in the National Register of Historic Places, and it appears that six others are eligible for inclusion. These five sites are: Lee's Ferry, the Kaibab Trail Bridge, El Dorado Canyon, Quartette Landing, and the towns of St. Thomas and Kaolin.

**SEGMENT 2. DAVIS DAM TO THE MEXICAN BORDER.** The area below Davis Dam contains 109 identified historic resources, 9 of which are listed in the National Register of Historic Places. Of these, 72 are of the historic period and 37 are archeological sites. Historic sites center on early settlement and

river crossings. Of the 72 historic periodic sites, 24 appear to be eligible for inclusion in the National Register of Historic Places. Archeological sites consist primarily of trails, campsites, petroglyphs, and intaglios. All of the archeological sites are considered to be potentially eligible for inclusion in the National Register of Historic Places.

Archeological sensitivity mapping was undertaken by WESTEC Services, Inc. as part of Phase II and is included in the supporting data submitted to the District. This study identified 7 miles of shoreline within the proposed General Permit areas that are likely to contain unrecorded archeological sites. These lands will be surveyed for the presence of cultural resources by the District prior to issuance of the General Permit.

### Cultural Resources

Current Native American use of the Colorado River includes individual recreation, commercial recreation, irrigation, and plant procurement. In terms of both dollar amount and intensity of effort, irrigation of agricultural lands is of primary importance.

Type and intensity of river use varies from reservation to reservation. Currently the Quechan at Fort Yuma and the Chemehuevi at the Chemehuevi Reservation operate recreation-oriented facilities including leased domiciles, boat landings, and concessions. By contrast the Colorado River Indian Tribes, Fort Mohave, and Cocopah reservations emphasize agriculture, although each group has considered or is considering establishing recreational facilities.

Documentation of Native American procurement and use of riverine plants and vegetation is sketchy because of the reluctance of many groups to discuss use of medicinal and magical plants. Fear that the publication of specific plant sources will lead to competition for, and depletion of, limited plant resources also hinders accurate documentation of Native American plant use.

In spite of the above considerations, interviews with tribal officials, local residents, and individual Native Americans provided the following of information regarding natural resource and plant use:

1. Native American basket makers still procure native plant fibers from riverine and wetland areas. These areas have been severely depleted by damming, agricultural land use, and extensive land clearing for a variety of land uses. Significant plant fibers include the Juncus acutus var. sphaerocarpus and Muhlenbergia ringens.
2. The Cocopah, and assumedly other tribal groups, still cremate certain deceased members. Traditional cremation requires large pyres of mesquite wood, an increasingly depleted wood source. The Cocopah at Somerton are forced to buy, or at least procure, their mesquite from neighboring Quechans at Fort Yuma. Continued loss of mesquite groves is perceived as a real problem by every tribal group contacted. Major groves that are of particular interest to Native Americans include those at RM 12-14.5, 1.5-4.5, and those near the Quechan reservation at the Fort Yuma Reservation (RM 30.5-32 and 23.5-28).

3. Clay sources, pigments within natural soils, and wildlife both within the river and along its shores are noted as used on an individual basis. Decreased access to such resources and continued depletion of them is seen as a serious consideration.

## LAND USE

### Introduction

The Phase I Environmental Resources Inventory Report included a survey of land use planning documents regarding the existing and projected development immediately adjacent to the Colorado River. The following discussion provides an update on the Federal, State and local management agencies having jurisdiction over the Colorado River study area and the current status of their respective plans and policies.

Current land use strategies and management plans are not available from either Lake Havasu City or the city of Needles. The Riverside County Planning Department, however, is currently conducting a series of public meetings in the Blythe-Palo Verde area to review the new draft Riverside County Consolidated General Plan. The new General Plan is a revision of the 1965 plan and will consist of regional development policies and standards, and reference maps of resources and infrastructures in individual community areas.

The Bureau of Land Management (1964) Lower Colorado River Land Use Plan, still considered to be generally applicable, provides an inventory of BLM resources along the river and has served as the management framework for six recreational management plans. To date, the Laguna-Martinez and Parker Strip plans have been completed. The Topock plan is being finalized, but is not yet published. In addition, it is not known when the Ehrenberg-Cibola, La Posa, or Lake Havasu Recreational Management Plans will be completed (personal communication, Hallett, 1981).

The recommendations contained in the subarea land use plans are designed to be compatible with the recommendations of seven different habitat management plans also being prepared for these areas. To date, only the Topock North and Buckskin Mountain plans have been published. Available federal funding will determine the completion of the remaining plans (personal communication, Ferrier, 1981).

Several of the Native American groups whose reservations are along the river are considering the development of marinas and campsites on their lands.

In March 1981, the Arizona Selection Board approved the recommendations of the State Land Department to apply for certain parcels of federal land comprised of lands owed to the state of Arizona by the federal government since statehood. Based upon the guidelines and criteria by the Citizens Task Force on In-Lieu Selection (January, 1980), the recommendations included approximately 63,408.7 acres along portions of the Colorado River, as identified in Table 6.

The guidelines recommend that the lands be put to their highest and best use; defined as development for residential and commercial uses. Assuming state acquisition, the intensity of development may have a cumulative effect on the existing riparian environment. Incremental development over a period of years will increase inland populations resulting in an increased utilization of riparian resources, focusing around recreational activities. A high density of boat docks along a stretch of river can preclude other riparian use or interfere with existing uses or safety standards. Experience has demonstrated that the associated increase in human activity usually degrades the aquatic environment and threatens other sensitive resources (e.g., archaeological and cultural resources).

Table 6. Arizona State Lands In-Lieu Selection

ID Number	General Description	Acreage
8-15-1	12 tracts in Mohave County in the vicinity of Bullhead City and the Colorado River	9,591.00
14-1-2 and 14-1-1	18 mi south of Parker to 14 mi north along Colorado River and State Highway 95 in Yuma County	34,789.106
14-11-1	Approximately 4.5 mi west of Somerton in Yuma County	1,896.00
14-11-2	Approximately 4.5 mi south of Somerton in Yuma County	3,620.00
14-4-3	Vicinity Ehrenberg and Colorado River in Yuma County	10,489.333
14-5-1 and 14-5-2	11 mile "strip"; centered 15 mi south of Ehrenberg along the Colorado River in Yuma County	3,023.26

Once these lands have been identified for selection, certain requirements must be followed to complete the selection process. The following is a summary of that process: the State Land Department files an application for the lands with BLM; BLM classifies the selected lands as available or not available for state selection; if the lands are available, BLM conducts environmental and other required studies; BLM issues and advertises a "Proposed Decision" to transfer federal lands to the State of Arizona; if objections are received, the State Land Department and BLM resolve the conflicts for continuance of the selection; and BLM issues a "Decision" and conveys the selected lands to the State of Arizona. It is not presently known how long the selection process will take to complete.

Although the jurisdiction of the district generally extends from the Ordinary High Water Mark riverward, a reconnaissance of existing land uses inland as well as on the river frontage was conducted in Phase I and is summarized and updated below.

#### Existing Land Use

SEGMENT 1. LEE'S FERRY TO DAVIS DAM. The entire stretch of riverfront between Lee's Ferry and Davis Dam is contained within the Grand Canyon National Park and Lake Mead National Recreation Area (NRA) with the exception of small stretches for Indian reservation and tribal lands. The Navajo Reservation borders the eastern bank of the river for 61.5 miles in the marble Canyon portion of the park at the junction of the Little Colorado River. Sheep grazing forms the primary land use on the reservation. The Havasupai tribe extends 49 miles within Grand Canyon National Park. Their "traditional use lands" are situated around the Great Thumb mesa between the canyon rim and south bank of the river. Although located within the park, the status of the tribal lands restricts use and management of resources which would interfere with or oppose traditional uses of the Havasupai. Adjacent to the Havasupai lands is the Hualapai Indian Reservation which extends 108 miles along the south bank of the river.

Hoover Dam impounds one of the largest artificial lakes in the western hemisphere, Lake Mead. National Recreation Area status ensures that land use is devoted to providing recreational opportunities for public enjoyment.

Land use extending from Hoover Dam to Davis Dam encompasses the southern arm of the Lake Mead NRA which includes Lake Mohave. Numerous public camping and boating facilities have been developed along the shoreline within this area, but access is much more limited in this area than along the Lake Mead shore.

#### SEGMENT 2. DAVIS DAM TO THE MEXICAN BORDER.

Subarea A. Davis Dam to Parker Dam. This portion of the affected environment encompasses three urban centers: Bullhead City (unincorporated) and Lake Havasu City in Arizona, Needles in California, and Laughlin in Nevada, all with city limits extending to the river. Two Indian reservations are situated here also: the Fort Mohave Indian Reservation, the majority of which lies opposite Needles on the Arizona side of the river, and the Chemeheuvi Valley Indian Reservation, which is located in California opposite Lake Havasu City. Land use on the reservations is primarily devoted to agriculture. However, a residential area occurs at Havasu Landing. Along this segment of the river is flanked by San Bernardino County, California; Mohave County, Arizona; and a fraction of Clark County, Nevada.

The general distribution of land use adjacent to the river in this reach of the region may be categorized as urban, agriculture, recreation, and Havasu National Wildlife Refuge, and Lake Havasu State Park. Recent evaluations by Mohave County planners (1979) indicates continued growth of the most rapidly growing area in the Bullhead City and Riviera-Big Bend vicinity as a retirement and recreational community. Recreational activities along the

Mohave Valley river area are anticipated to increase in conjunction with population growth. However, the remoteness of the area from major urban centers is expected to curtail significant increases in development.

Bullhead City, Laughlin, the Riviera-Big Bend area, Lake Havasu City, and Needles provide the highest concentration of urban use in proximity to the river along this segment. Residential uses prevail along the river in Bullhead City/Laughlin and the Riviera-Big Bend area. Needles also contains some private residential developments along the river. Most of the residential developments with waterfront locations contain boat docks. Unique to any of the urban areas studied, Laughlin features casinos on the Nevada side of the river. Several of these facilities are situated on the waterfront. Access to the casinos is readily available by ferry from the Arizona shore. Contacts in both Bullhead City and Needles attribute much of the accelerated population growth and residential development rate to the casino development.

Besides the residential uses along the river common to these cities, Lake Havasu City and Needles contain public recreation areas adjacent to the river. The Needles' city facilities include marinas, campgrounds, and golf courses. Description of these facilities are discussed in greater detail in the Recreation section of the Phase I report.

The majority of land lying adjacent to the river in Lake Havasu City is stateleased park land, under federal ownership. Twenty-three miles of shoreline provide a 1,000 foot buffer zone between the lake and private property. Some of the land has been leased to private interests which have been permitted to construct commercial recreational facilities. The waterfront in the general Lake Havasu area contains not only several camping facilities with marinas and boat docks, but also day facilities, a golf course, and local airport. The configuration of the city boundaries precludes development by the city on the river.

The last major land use in this reach includes the Havasu National Wildlife Refuge in Arizona. The boundaries of the refuge run southerly from the southern limits of the Fort Mohave Indian Reservation to the northern limits of Lake Havasu State Park. The river portions of the refuge interface with a variety of parks, marinas, landings, trailer parks, the Chemehuevi Valley Indian Reservation, and the community of Topock.

Subarea B. Parker Dam to Blythe. This portion of the affected environment encompasses the counties of Yuma, Arizona, and San Bernardino and Riverside, California. The town of Parker in Arizona represents the only incorporated municipality in the area whose corporate boundaries extend to the river. The Colorado River Indian Reservation represents the largest single political entity between Parker Dam and Blythe.

Between Parker Dam and the northern boundaries of the reservation is a stretch of river commonly referred to as the "Parker Strip." This narrow band of river area lies within BLM lands in portions of Yuma and San Bernardino Counties. Each side of the river is densely packed with an assortment of



residences (primarily mobile homes), campgrounds, recreational vehicle facilities, and associated commercial enterprises as this stretch is heavily utilized for recreational boating and waterskiing.

The town of Parker is essentially surrounded by the Indian reservation. Due to this fact and the Indian policy not to sell land, the town of Parker cannot expand its present city limits. This situation has prompted the town to seek additional land for annexation elsewhere following the recommendations of a research study conducted for Parker. A location for the additional townsite has not been finalized but is not likely to be contiguous to the existing town on the river. The town presently has no significant influence on river use as its jurisdiction is limited to 2,078 linear feet.

Agricultural land use dominates the area as defined by the reservation and general Parker Valley area. The balance of the area stretching south to Ehrenberg (Arizona) and Blythe (California) is comprised of natural open space areas. A few recreational trailer parks are scattered along the river. It is the general policy of San Bernardino and Riverside Counties to retain county areas adjacent to the river for open space and recreational uses. Permanent residential developments are discouraged.

Subarea C. Blythe to the Mexican Border. The border between Yuma County, Arizona and Riverside and Imperial Counties, California is formed by this segment of the Colorado River. The cities of Blythe and Yuma are the major urban centers in this area. Blythe is separated from the river by unincorporated lands and as such, it maintains no public or private facilities on the river. Isolated residential communities are situated in Ehrenberg in Yuma County and an isolated stretch of Riverside County land between the Mayflower County Park and northern limits of Blythe. These two areas are primarily trailer park sites. An increasing number of trailers are being introduced year-round according to the Mayflower County Park ranger. Riverside County maintains a series of parks and marinas on the river on either side of Interstate 10. Riverside County land areas immediately adjacent to the river near Imperial County are restricted to open space and recreational use. Further from the river, the general use is predominantly agricultural.

Land use for the entire length of Imperial and the remainder of Yuma County adjoining the river is generally natural open space as the majority of the river is contained within the Cibola and Imperial National Wildlife Refuges and the Mittry Lake Refuge. A few recreational parks and campgrounds are interspersed in these areas such as Picacho State Recreational Area. Natural open space areas continue to dominate the riverbank landscape south of the city of Yuma. However, agricultural use is evident in some adjacent portions of the river.

The last segment of the river preceding the US/Mexican border is owned primarily by the City of Yuma and the Yuma Indian Reservation. This stretch of river area exhibits open space and wildlife habitat uses. Recreational use is generally restricted to fishing due to the shallowness of the river. The consensus of the city of Yuma and public at large is supportive of development of this entire riverbank area as a single continuous park. Efforts toward developing a park plan and coordination with various federal agencies are underway.

## POPULATION

The affected environment includes the boundaries of seven counties in three states. These include Coconino, Mohave and Yuma Counties in Arizona; Clark County in Nevada; and San Bernardino, Riverside and Imperial Counties in California. The reach of the river between Lee's Ferry and Davis Dam is completely under the jurisdiction of the National Park Service and consists of the Grand Canyon National Park and Lake Mead National Recreation Area. There are no permanent population centers along this stretch of the river, however, the proximity of Lake Mead to the Las Vegas area and its proven popularity warrant its inclusion in this study. Population along the lowest portion of the river, between Davis Dam and the Mexican border, tends to be concentrated in a few locations which serve varying purposes, yet in which tourism and recreation play major roles. Figure 1 of the EIS illustrates existing and projected populations for the major population centers on the lower Colorado River.

In general, there are two recreational seasons along the river which provide year round clientele for the many services offered in the bordering towns. Winter visitors, typically termed "snowbirds" by the local population, are represented by East Coast residents and Canadians who spend from weeks to months in the comparatively mild winter climate. The winter season generally lasts from December to April when a change in visitor population characteristics occurs. Easter week is the turning point of the seasons, the time when the older and "snowbird" populations are replaced by a younger sun-seeking crowd. Peak visitor days coincide with school and national holidays which provide from three to seven vacation days. The average length of stay for a summer visitor is typically shorter than that of a winter visitor.

While there is a dichotomy of use and visitors, certain portions of the river serve as year round resort areas. However, the summer peak tends to be somewhat larger in most areas than the winter for several reasons:

1. Proximity to population centers in southern California, Nevada, and Arizona. Three-day weekends and holidays in May, July, and September coincide with the greatest number of user-days at river and lake resorts.
2. The nature of the area and recreational activities available. Waterskiing and sunbathing are by far the most popular activities in the summer. The hot, dry climate stimulates the demand for water-based summer activities which brings large crowds to the river, primarily on weekends.
3. The majority of annual crowd-attracting events along the river coincides with the late spring, summer, and early fall months. Such events include fishing, waterskiing, tubing, and speedboat-related activities.
4. River-related activities are especially attractive to younger persons and families who represent the majority of the summer crowd.

Preliminary figures of the 1980 census indicate inordinately large growth of two population centers along the Colorado River. Those displaying the greatest expansion are Lake Havasu City and Bullhead City, Arizona. Total population increase between 1970 and 1980 was approximately 224 percent and 168 percent, respectively. Parker and Yuma, Arizona experienced lower growth levels, equal to those of Phoenix and Flagstaff, between 31 and 46 percent as indicated in Table 9. The population growth rates of all Arizona cities in this study are projected to decrease during the 1980s, however, Lake Havasu City, Parker, and Yuma are projected to experience an increase in population growth rates between 1990 and 2000.

Population centers on the California side of the river, Blythe and Needles, experienced very low growth levels and possibly, in the case of Blythe, even experienced population decline between 1970 and 1980. The 1980 census figure is being contested by the city but remains official until such time that a miscount is declared, as is the case with several other preliminary census figures in the report.

The timing of the Phase II study allowed 1980 population figures, and consequently projects, to be updated. However, many figures have not been finalized to date and therefore some discrepancies may exist. In addition, a note of caution must be applied when assessing population projections. The projection of a future population from a present rate of growth can be unreliable since rates contain many variables and are sensitive to small changes in any variable. Therefore, the reader is cautioned not to take the projected rates and figures in this discussion as unalterable.

#### Segment 1. Lee's Ferry to Davis Dam

The stretch between Lee's Ferry and Davis Dam is primarily occupied by publicly owned and used land. Except for small Native American populations, there are no permanent population centers in this area.

#### Segment 2. Davis Dam to the Mexican Border

SUBAREA A. DAVIS DAM TO PARKER DAM. The stretch of the Colorado River between Davis Dam, which impounds Lake Mohave, and Parker Dam, which impounds Lake Havasu, is bordered by three states: California, Nevada, and Arizona; and as many counties. The three major population centers along this segment of the river are Bullhead City and Lake Havasu City, Arizona, and Needles, California. Approximately one half of the land area between Davis and Parker Dam is occupied by two Indian Reservations. The Fort Mohave Indian Reservation, opposite Lake Havasu on the California side of the river, are both relatively sparse in terms of population.

Bullhead City, one of two major population centers along the river in Mohave County, is located just south of Davis Dam in Arizona near the confluence of three states. The city and surrounding areas of Holiday Shores, Riviera, Big Bend, etc., is a growing community of permanent residences, trailer homes, and business and commercial enterprise. Permanent residents, mostly retirees, often leave the area during the summer. The winter population includes many persons occupying second homes who are not included

in census figures which, for 1980, indicate a permanent population of 10,090 persons. The 1980 figure is approximately 168 percent above the estimated 1970 population level which serves as an indication of the exorbitant growth rate experienced during the 1970s. Yet, Bullhead City is only ranked second in growth rate during this period. The projected rate of growth indicates a slowing trend for the rest of the century, however, it is unlikely that it will slow to the projected 29 percent during the late 1980s unless a no-growth policy is actively undertaken by the city. Instead, it is likely that the area, with its many attractions such as Lake Mohave Resort which centers upon the facilities offered at Katherine's Landing (primarily boating and camping oriented) and gambling casinos on the Nevada side of the river which provide free ferries to transport recreationists across the river, will continue to experience growth levels somewhat above the county average.

The Nevada side of the river is much less urbanized than the Bullhead area, with riverfront development limited to casino operations in Laughlin and a few sparsely scattered residential areas north of the generating station.

The City of Needles is located on the western side of the Colorado River between Bullhead City and Lake Havasu City. It serves as the major port of entry into the California Mohave Desert along Highway 66. Population growth in the city is rather slow compared to the cities located on the east side of the river. Permanent population only increased by 69 persons during the 1970s, a rate of 1.7 percent over 10 years. However, seasonal population, which is not enumerated, may have increased significantly in this time and city officials are questioning the census figure. Much of the past population growth has been attributed to retirees who seek the warm, dry climate and moderate pace of life. Projections of future population levels are presently unavailable.

The second major city in Mohave County on the Colorado River is Lake Havasu City which is located on the eastern shore of Lake Havasu. The city was incorporated in 1978, 15 years after its establishment by the McCulloch Corporation as a planned community. The Lake Havasu City area has been the fastest growing region in Mohave County, and along the river, since that time. The estimated 1970 population for the area was 4,861 which grew to 15,737 by 1980, resulting in a 223 percent increase. Lake Havasu City is designed to accommodate an ultimate population of 60,000, with 20,000 planned dwelling units. Additional projections for Lake Havasu City, obtained from the District IV Council of Governments, are included in Table 7.

The economy of Lake Havasu City is primarily based upon the manufacturing sector which provides a strong economic base for the city and promotes continued population growth. In addition, Lake Havasu City offers extensive recreational activities which focus on the lake. The entire shoreline adjacent to the city is publicly owned as part of Lake Havasu State Park which was created in 1965, and no residences are located within 1,000 feet of the lake.

South of Lake Havasu City to Parker Dam existing urbanization is limited to trailer parks and marinas (approximately three on each side of the river) mainly due to limited shoreline access and publicly owned land.

**SUBAREA B. PARKER DAM TO BLYTHE.** The segment of the affected environment between Parker Dam and Blythe/Ehrenberg is skirted by three counties in two states. Yuma County has one large population center located on the Colorado River in this region, Parker, Arizona. Blythe, the only California population center, is located in Riverside County.

Parker is located on Arizona State Route 95 south of the point where the Bill Williams River enters Lake Havasu. The Parker vicinity is composed of several interrelated but separate areas including the town of Parker, the Colorado River Indian Reservation (which entirely surrounds the town), the Parker Strip (consisting of the Arizona and California sides of the river north to Parker Dam), and the Bill Williams River area as well as the communities of Parker Dam, Gene Camp, and Lower Lake Havasu in California. These separate areas form the "community" of Parker.

Statistical information on inhabitants of this area is rather limited and there is little agreement on total or projected population figures. District IV of the Arizona Council of Governments (COG) has made projections for the area which are included in Table 7. However, other estimates indicate more rapid growth trends than the COG. The inconsistency of available figures may stem from a large proportion of seasonal habitants since the "Parker Strip" is one of the most heavily used sections of the river. All types of water sports are available in the vicinity and a recent study indicates that this area has reached its saturation point with respect to summer recreational use (Greedy, et al., 1979).

COG figures indicate that population along the "Strip" grew from 2,764 in 1970 to 3,642 in 1980, a 31.8 percent increase. COG projections for this area project an average annual increase of 1.1 percent over the next decade.

Factors which have promoted growth of the Parker area include the following:

1. **Site:** The proximity of two major dams, Headgate Rock and Parker, provide a wide range of year-round recreational activities. Numerous camping areas occur along the river to accommodate the large crowds which utilize one of the most favored river areas.
2. **Situation:** Parker is located roughly equidistant from the three major population centers of Los Angeles, Las Vegas, and Phoenix. A study in 1969 revealed that 92 percent of all visitors to either side of the "Parker Strip" originated in California. However, as the population of all three areas grows, it is anticipated that the number of visitors from the other areas will also increase.

The city of Blythe is located 96 miles south of Needles at the northern end of the Palo Verde Valley in California. Although the city maintains no facilities on the river, county parks and marinas serve as the hub of aquatic activities in the area.

A limited number of retirees have located in the city which are surpassed by the substantial seasonal population. As a result, the 1980 census figure indicates a 3.4 percent decline in population during the past decade. Permanent population decreased from 7,047 in 1970 to 6,805 in 1980. The latter figure is being disputed by city officials who contend that while the population may not have grown during the past decade, it certainly did not decline. The discrepancy, however, may stem from the seasonal nature of many residents who do not declare Blythe as their permanent home (communication with City of Blythe, 1981).

Table 7. Civic Population Along the Lower Colorado River for cities with Populations Greater Than 2,500

City/State	1970	1980 <sup>2</sup>	1990 <sup>4</sup>	2000 <sup>4</sup>
Bullhead City, AZ	3,763 <sup>3</sup>	10,090	13,038	15,788
Needles, CA	4,051	4,120	N/A	N/A
Lake Havasu City, AZ	4,861	15,737	18,637	22,537
Parker, AZ Area	2,764	3,642	4,038	5,162
Blythe, CA	7,047	6,805	N/A	N/A
Yuma, AZ	29,007	42,433	48,338	55,738
TOTAL	51,493	82,827		

1. Includes both sides of Colorado River from Parker Dam south to Poston on the Colorado River Indian Reservation.
2. All 1980 figures are preliminary census figures, unless otherwise noted and subject to revision.
3. Interpolated from existing figures.
4. Projected figures.

SOURCES: Arizona District IV Council of Governments  
California State Department of Finance  
Lake Havasu City Chamber of Commerce

Population projections for the city of Blythe remain unavailable at the time of writing. Present information indicates that recreation and tourism play only secondary roles in the city as agricultural products from the Palo Verde Valley provide a greater source of revenues. The local Chamber of Commerce reports an increase in the number of visitors from the Phoenix area. The recent influx of recreationists is primarily associated with the restriction of boating and camping along the Salt River.

SUBAREA C. BLYTHE TO THE MEXICAN BORDER. This segment is characterized by a lack of development and presence of the Imperial and Cibola Wildlife Refuges and several county parks. No significant population centers occur on the California bank of the river, but private developments in Imperial County include Walter's and Mitchell's camps which support small elderly populations. One significant population center (Yuma), the largest of those included in this study, is situated on the Arizona shoreline.

The southernmost population center along the Colorado River is Yuma, Arizona. The 1980 population is an approximate 42,433 persons as this figure is also being contested. Past growth rates have fluctuated considerably. The city grew 162 percent during the 1950s, but only 21 percent the following decade. Using the census figure, population increased over 46 percent between 1970 and 1980. COG projections indicate that city growth will slow during the 1980s to a level near 14 percent (Table 8).

In conclusion, the Colorado river remains the source of water, and therefore life, of the desert. It is the major attractive force which draws millions of visitors annually to its banks along which numerous resorts and towns have sprung over the years. Certain sections of the river offer a greater variety of recreational uses and thus attract more visitors than others. In general, towns situated in these areas have experienced greater levels of population growth. Recreational activity, and therefore population growth, is concentrated in the following areas:

1. Bullhead City, which offers recreational opportunities both on Lake Mohave and south of Davis Dam. Population increases 168 percent in the past ten years.
2. Lake Havasu City, a planned community designed to offer both water recreational amenities and a solid economy based on industrial activity. A population increase of over 233 percent in the past decade made this the fastest growing city in the study area.
3. Parker, an area of continuous recreational use, has not experienced such rapid population expansion but rather a steady rate of increase over a much longer period. Growth of this area has also been influenced by the location of the Colorado River Indian Reservation, which occupies an extensive stretch of shoreline and surrounding area, and BLM-managed land, primarily on the California bank.
4. Yuma, the largest city in the study area, does not rely on amenities afforded by the river for its recreational mainstay, although several recreational areas exist along nearby portions of the river. Most Yuma visitors are averted from the river by other attractions which include both seasonal events, such as the Yuma County Fair, or such perennial exhibits as the Yuma Territorial Prison.

Table 8. Percent Change in Population by Decade

City/State	1970-80	Projected 1980-90	Projected 1990-2000
Bullhead City, AZ	168.1	29.2	21.1
Needles, CA	1.7	N/A	N/A
Lake Havasu City, AZ	223.7	18.4	20.9
Parker, AZ Area	31.8	10.9	27.9
Blythe, CA	-3.4	N/A	N/A
Yuma, AZ	46.3	13.9	15.3
Kingman, AZ	26.6	18.4	17.1
Flagstaff, AZ	45.5	N/A	N/A
Phoenix, AZ	31.3	17.7	21.4
Tucson, AZ	25.7	8.9	9.5
Las Vegas, NV	30.9	21.2	6.7
Las Vegas Township	83.3	N/A	N/A

N/A = Not Available

Population centers along portions of the river which are less favorable to water skiing and other recreational activities have not recently experienced such high levels of growth. In most instances, though, they house a large seasonal and/or retiree population. Needles and Blythe exhibit such attributable features.

Future growth along the river is anticipated to occur in the same areas in which population is presently expanding. Area projections, however, indicate a slowing of growth trends. No projections on visitor level exist, and therefore it can only be assumed that these levels will be maintained or may increase in proportion to surrounding population increases and recreational restrictions such as those experienced in the Phoenix area.

**NATIVE AMERICAN POPULATION.** Native American population along the lower Colorado River between Davis Dam and the Mexican border is relatively sparse, amounting to a total of roughly 4,907 persons (Arizona Commission of Indian Affairs, 1980). The largest concentration of Indian population occurs on the Colorado River Reservation which occupies nearly 226,000 acres. It entirely surrounds Parker, Arizona and extends across to the California side of the river. Several tribes, including the Mohave, Chemehuevi, Hopi, and Navajo, occupy this land. Total Indian population on the Colorado River Reservation amounts to 3,070. Some land is leased to whites who then add to the reservation population, however, the non-Indian population of leased areas along the Parker Strip are included in the Parker figure.

Two tribal clusters are located near Yuma. The Quechan population of approximately 1500 occupies the Fort Yuma Reservation which occupies a wedge of land between the Colorado River and the All American Canal in California. The Cocopah people are clustered south of Yuma. Approximately 835 persons live on 1,773 acres of land.



Fort Mohave Indian Reservation is located south of Bullhead City and occupies land on both sides of river. Their people number approximately 502. River use by all Native American populations considered is based on primarily on subsistence or economic activities rather than recreation. In addition, population on the reservations is increasing at rates well below the non-Indian populations previously discussed. As such, impacts of related population on the river are minimal and, if they do occur, would be associated with the non-Indian populations occupying Indian lands by lease.

SIGNIFICANT POPULATION CENTERS WITHIN 350 MILES OF THE LOWER COLORADO RIVER. Since a vast number of people visit the river annually, a summary of demographic conditions existing in both the proximate towns and areas of visitor origin is appropriate. Within the three bordering states, the most significant area of visitor origin is southern California. Conversations with park and city officials in addition to published sources disclose that over 90 percent of all summer visitors to the river originate from this area. Second, in terms of origin, is Arizona with a figure varying between one and five percent.

The growth of southern California's population, while occurring at varying rates internally, is believed to provide the single-most direct impact upon recreational demand of the Colorado River. Certain economic factors may temporarily dissuade inhabitants of this area from utilizing river resources as frequently, but the demand for sunshine and aquatic sports continues to exist. Further study is necessary to determine from which areas of southern California visitors originate most before precise user projections can be determined. Presently, however, 12.8 million people live in the area. By 2000 that figure is estimated to exceed 15.3 million and comprise 75 percent of the population of all counties in this study. Population is broken down by city and county in Tables 9, 10, and 11. The addition of 2.5 million people to the southern California population at the present level of river demand has the potential to significantly affect existing recreational centers.

Several counties in Arizona are growing more rapidly than the southern California area; however, their aggregate number does not approach that of the aforementioned population. Furthermore, the percentage of Arizonian visitors to river resorts is estimated to be less than five percent which in final assessment is, at the present, relatively insignificant in comparison to the California market area.

The majority of Arizonians reside in Maricopa and Pima Counties. It is known that recent boating restrictions placed on the Salt River in Maricopa County have led to increased use of certain areas of the Colorado River by residents, particularly those of the Phoenix area.

Clark County in Nevada borders the Lake Mead NRA portion of the river. Total county population is presently near 410,000. Recreational demands are primarily focused upon the closest river access areas of Lake Mead. Population expansion is anticipated to slow before any significant effect on river use occurs.

Table 9. Population Centers in Proximity to the Lower Colorado River  
Arizona and Nevada

City/State	1970	1980 <sup>4</sup>	1990 <sup>5</sup>	2000 <sup>5</sup>
Kingman, AZ	7,312	9,257	10,960	12,830
Flagstaff, AZ	26,117	38,000 <sup>1</sup>	N/A	N/A
Phoenix, AZ	582,500	764,911	900,000	1,093,000
Tucson, AZ	262,933	330,537	359,874	394,013
South Tucson, AZ	N/A	6,554	6,185	6,075
Las Vegas, NV	125,787	164,674 <sup>2</sup>	199,653	213,050
Las Vegas Township, NV (includes Las Vegas)	191,260	<u>350,511</u>	424,819 <sup>3</sup>	709,448 <sup>3</sup>
TOTAL		1,499,770		

1. Estimate of 1980 population made in 1979.
2. Not included in total figure.
3. Interpolated from existing population figures at a rate commensurate with that of the city.
4. All 1980 figures are preliminary census figures, unless otherwise noted, and subject to revision.
5. Projected figures.

SOURCES: Arizona Department of Economic Security

Flagstaff Chamber of Commerce

Las Vegas Department of Planning

Table 10. Related Counties Populations and Projections  
1970-2000

County/State	1970	1980	1990	2000
Coconino, AZ	48,326	74,947	105,400	132,000
Maricopa, AZ	971,228	1,508,030	2,041,800	2,631,600
Mohave, AZ	25,857	55,693	68,985	82,576
Pima, AZ	351,667	531,263	673,600	841,200
Yuma, AZ	60,827	90,544	102,891	123,183
Imperial, CA	74,492	92,110	113,100	129,100
Los Angeles, CA	7,041,980	7,477,657	7,638,828*	7,800,000
Orange, CA	1,421,233	1,931,570	2,399,700	2,758,100
Riverside, CA	456,916	663,923	835,523	947,123
San Bernardino, CA	682,233	893,157	1,051,857	1,197,957
San Diego, CA	1,357,854	1,861,846	2,278,149*	2,647,200
Clark, NV	273,288	410,817	659,600	866,900
TOTAL	12,765,901	15,591,557	17,969,433	20,156,939

\* Interpolated figures from existing data.

All 1980 figures represent preliminary 1980 census data available 4/81.

SOURCES: Arizona Department of Economic Security  
Arizona District IV Council of Governments  
Pima County Department of Planning and Zoning  
Nevada Department of Economic Development  
City of Las Vegas Planning Department  
Los Angeles County Plan Monitoring Department  
San Diego Association of Governments, Research Division  
County of San Diego  
California State Department of Finance

Table 11. Percent Population Change Per Decade by County

County/State	1970-80	Projected 1980-90	Projected 1990-2000
Coconino, AZ	55.1	40.6	25.2
Maricopa, AZ	55.3	35.4	28.9
Mohave, AZ	115.4	23.9	19.7
Pima, AZ	51.0	26.8	24.9
Yuma, AZ	48.9	13.6	19.7
Imperial, CA	23.7	22.8	14.1
Los Angeles, CA	6.2	2.2	2.1
Orange, CA	35.9	24.2	14.9
Riverside, CA	45.3	25.8	13.3
San Bernardino, CA	30.9	17.8	13.8
San Diego, CA	37.1	22.4	16.2
Clark, NY	50.3	60.6	31.4

## RECREATION/PUBLIC SAFETY

Public safety on the Colorado River comes under the jurisdiction of numerous public agencies, many of which are overlapping. These include the U.S. Coast Guard, the National Park Service, the Arizona Game and Fish Department, the California Department of Fish and Game, the Nevada Department of Wildlife Resources, the U.S. Fish and Wildlife Service, the Arizona State Parks Department, the California State Parks Department, the Yuma City Police Department, the Needles Police Department, the U.S. Army Corps of Engineers, and the sheriff's departments for Yuma, Mohave, Clark, Imperial, San Bernardino, and Riverside Counties. The U.S. Coast Guard until recently had jurisdiction over the entire length of the Colorado River from Lee's Ferry to the Mexican border. They enforced federal laws and had the legal capacity to board any boat even if no violation was obvious. State laws were, and still are, enforced by the fish and game departments of the respective states. State safety laws tend to be stricter, in some cases, than federal laws, therefore, public safety on the river is not anticipated to be jeopardized as a result of Coast Guard withdrawal.

An administrative problem related to the river safety is that no agency has sole responsibility for marking hazards on the river (such as rocks, logs, snags, etc.), or for maintaining navigational aids. This has resulted in an overall level of decreased safety on the river. In addition, there are very few restricted areas along the Colorado River, resulting in a great variety of mixed uses along most sections currently being studied. This intermixing of activity causes motorbats, waterskiers, and jet skis to impose great safety hazards on people who are swimming, tubing or rafting. Also, fishermen and waterskiers often compete for use of the same areas which causes many quarrels. Conflicts between canoeists and motorboaters often arise when motorboaters pass close to the canoes or cause large waves in the current. In spite of all these problems, it is the general consensus among the agencies that it would be difficult to enforce a restriction of uses along the river, separating motorized from non-motorized activities.

Additional sources of accidents on the Colorado River include dams and their associated spillways, outlets, siphons, and warning cables; narrow channel beneath bridges; violation of boating laws; curves on the river; and weather. Most dams have log booms or cables stretched across the water on the up and downstream sides. These are difficult to see even in daylight and cables can be lethal if not avoided. Likewise, fatalities have occurred when boats have struck bridge pilings or were carried against them by the current.

The larger lakes get rough on windy days, especially on the leeward shore, in canyons. Sudden rainstorms may produce flash floods in the many canyons along the river, both of which have the potential to affect the safety of recreationists both on the river and the shore.

Posted speed limits along the Colorado River are rare, but California law always restricts speed under certain conditions. Boats must slow to 5 mph when passing by a landing or swimming floats and within 100 feet of any bather; within 200 feet of a bathing beach, diving platform, or lifeline; and in any harbor. Skiing after sunset and before sunrise is prohibited, as is

skiing around bends in the river, however there are constant violations of all these laws.

There are both private and community boat docks along the Colorado River, with the vast majority being single docks. Community docks are, for safety reasons, considered to be preferable to individual docks by the seven-state Colorado River Wildlife Council. The patrolling agencies agree, with one exception: when the river is narrow, more small docks are preferred to fewer larger docks which further decrease channel width and increase navigational hazards.

#### Segment 1. Lee's Ferry to Davis Dam

This segment of the Colorado River is entirely comprised of areas within the Grand Canyon National Park and within Lake Mead National Recreation Area. The National Park Service and the Arizona Game and Fish Department patrol Lake Mead, Lake Mohave, and the Grand Canyon within the park. No boating safety problems have been identified in the Grand Canyon.

River use in the Grand Canyon between Lee's Ferry and Pierce Ferry is primarily comprised of whitewater rafting groups originating at Lee's Ferry. During the late 1960's and early 1970's, river running in the Grand Canyon increased significantly, causing serious environmental impacts on the resources along the river. In 1973, river running use was restricted to the use level of 1972 and a study program was initiated to determine the extent and nature of impact. The studies were completed in 1976, and a draft river management plan was approved in 1979. The plan included the phasing out of motorized boats from Lee's Ferry to Separation Canyon by 1985. The plan also included other various restrictions on boat usage within the Park. However, amendments to the National Park Service Appropriations Act of 1981 have overruled the 1979 Management Plan and sets usage at 1978 levels, requires that an economic base for commercial operators be retained, and mandates continued motor use on the river during the months May through September.

The primary summer activities between Hoover Dam and Davis Dam are associated directly or indirectly with boating. Numerous marinas, boat ramps, and other concessions are located in the three major public use areas of Willow Beach, Katherine's Landing, and Cottonwood Cove.

#### Segment 2. Davis Dam to the Mexican Border

SUBAREA A. DAVIS DAM TO PARKER DAM. This river subarea is comprised largely of two very different types of landscapes and development. It includes many of the narrower parts of the Colorado River, where recreational uses are generally less intense, and it includes three primary areas of urban development: the Bullhead City/Riviera (Laughlin) area, Needles, and Lake Havasu, with development primarily located on the eastern shore around Lake Havasu City. Lake Havasu is the only large water body within this segment of the river.

Recreational activities within this subarea include gambling (in Laughlin, Nevada), swimming, water skiing, tubing, camping, fishing, canoeing, and, to a lesser extent, scuba diving, rock collecting, golfing, and touring (Davis Dam, the London Bridge, and the Oatman gold mines). In a recent study by the U.S. Bureau of Reclamation, the most common recreational activities in the Havasu segment of the river were picnicking and camping.

Recreation along the narrower parts of the river tend to be less hurried and less crowded than at other locations along the river. Floating on inner tubes and fishing predominate over motorboating and water skiing. This is especially true in Topock Gorge, a narrow, very scenic canyon walled in by the Chemehuevi Mountains on the west and the Mohave Mountains on the east. It is a popular haven for fishermen, canoeists, and tubers, and this portion of the river is used primarily for non-motorized boating activities. The U.S. Fish and Wildlife Service, in a 1976 study by the Army Corps of Engineers, noted that Topock Gorge was a unique area with outstanding fish, wildlife, and associated recreation and aesthetic values that should be protected from development.

Although along the narrower parts of the river the gorge becomes somewhat sinuous and the location of the numerous sand bars is constantly changing, safety problems are not a major issue. The construction of shoreline developments into specific, limited areas creates larger, more safe open stretches of river between the developed areas.

Urban development within this segment is concentrated at the upper and lower ends, around Bullhead City, Riviera (Laughlin), and Lake Havasu City, with a small amount of development around Needles and Havasu Landing. The areas north and south of Bullhead City on the Arizona side of the river are slightly urbanized and include a mixture of single-family dwellings, mobile home parks, campgrounds, boat ramps, and docks. In contrast, the Nevada side of the river in this area has only one campground, Sportsman's Park. This area currently has several camping establishments, with more yet in the planning stages. Most visitors come to this area from southern California to gamble in Laughlin, to enjoy the boating activities, or, to a lesser degree, to see the old gold mining town of Oatman further to the east. Visitor use in the area is generally split fairly equally between water skiers and fishermen. The skiers are usually predominant during the day, with fishermen out largely in the early morning and late evening. There are continual conflicts between skiers and fishermen, and residents have complained about the noise from the motorboats. In addition, there are many tubes, rafts, and canoes on this section of the river on weekends. Other recreational activities in the vicinity of Bullhead City include golfing, rock collecting, and touring Davis Dam.

The Bullhead City/Laughlin area is one of the most hazardous areas of the river. This is due to at least four factors: (1) a large number of boat docks and boats; (2) the narrowness of the river; (3) the curve in the river at River Bend; (4) use of the river by many different user types (i.e., fishermen, water skiers, rafters, canoeists, etc.). In addition, the ferries that shuttle people between Bullhead City and the gambling establishment across the river in Laughlin, Nevada create cross-traffic at Bullhead City

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LOWER COLORADO RIVER PROPOSED GENERAL PERMIT MAIN  
REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT(U) ARMY  
ENGINEER DISTRICT LOS ANGELES CA APR 82

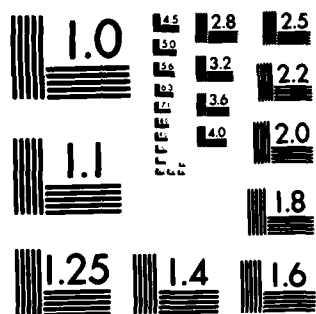
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which is further complicated by the swift current which prohibits a direct cross-stream course.

The Needles area has several marinas, a municipal golf course, several campgrounds, and motels. Just southeast of Needles is Topock Marsh which is included in the Havasu National Wildlife Refuge. Recreation in the Needles area is largely comprised of boating activities, with fishing, camping, hunting, and golfing playing lesser roles. Havasu National Wildlife Refuge is managed primarily for hunting and is open to hunting during the waterfowl season. Topock Marsh is also popular for fishing, wildlife observation, and canoeing. Camping areas for tents and mobile homes are available within the refuge. Just south of Topock Marsh, in the vicinity of Topock, there are scattered mobile homes and a number of recreational parks, campgrounds and marinas. Camping and boating activities predominate.

South of Topock Gorge the river widens out into Lake Havasu. There are scattered homes and mobile homes along both sides of the upper reaches of the lake. Development on the eastern side tend to be more clustered and to have much more open space between the developments.

Lake Havasu City is a highly urban planned resort community on the east side of Lake Havasu. It includes a manmade channel which separates the city's business district from recreation-oriented Pittsburg Point Island. The restored London Bridge spans the channel and is a major tourist attraction.

Lake Havasu State Park occupies 13,000 acres of land along 26 miles of the eastern shore of Lake Havasu. It includes numerous picnic areas, marinas, campgrounds, resorts, townhouses, Mohave Community College, a reclamation plant, parks, swimming areas, boat camping areas, and numerous boating facilities. Lake Havasu Marina is one of the largest on the Colorado River. Havasu Spring, located on the southeastern shore near the Bill Williams River, includes a Camper Float marina which caters to people who want to take their recreational vehicles out on the lake.

The California side of Lake Havasu is, by comparison to the Arizona side, much less developed. It is largely within the Chemehuevi Valley Indian Reservation and consists of very barren mountainous land. The Havasu Landing area, on the Chemehuevi Indian Reservation, has several recreational developments, including a marina and numerous private boat docks. Recent trends indicate a potential for increased recreational improvements in the future, although no recreation plan exists for the reservation.

Public Safety is a major issue at Lake Havasu. Arizona Game and Fish Department boating records for total accidents, accidents with injuries, and accidents with fatalities rank Lake Havasu as either 1, 2, or 3 for all years since 1974. The Pittsburgh point area has the potential to become an area of significant safety problems if developed over the current level. The London Bridge canal area is already a problem.

**SUBAREA B. PARKER DAM TO BLYTHE.** This segment of the Colorado River encompasses a wide variety of recreational uses, ranging from canoeing, bird watching, and tubing to water skiing, camping resort activities, hunting

clubs, and tours of Parker Dam. BLM's Empire Landing Recreation Site and River Land Resort; the Giant Desert Figures Historic Landmark (intaglios); Mayflower County Park, Ah Villa County Park, and numerous private resorts, campgrounds, and marinas are located here. More specific information is included in the Phase I report.

The northern quarter of this river subarea between Parker and Parker Dam (the 15-mile-long Parker Strip) is much more highly developed with recreational facilities than the remaining three-quarters. Headgate Rock Dam, approximately 15 miles south of Parker Dam and just above Parker, backs up Lake Moovalya. This 15-mile long lake is about 400 feet wide at its widest point and has historically attracted heavy use by skiers and powerboaters. Private and public resorts, residences, and parks abound on the eastern side of the river. They are present to a lesser degree along the west side of the river, which has nearly all mobile homes. Lake Moovalya is largely surrounded by BLM land and by land within the Colorado River Indian Reservation. The Indians have leased lands to private developers and squatters have illegally constructed dwellings and permanently located house trailers in the area. In addition, BLM has 13 concessioners on the Parker Strip. The current BLM policy is to lease land where it is conducive to the needs of the area as determined by the BLM.

The Parker Strip probably has the highest density of boat docks on the entire Colorado River. While the overall river density was estimated in 1976 to be about 9 docks per mile of river frontage, the Parker Strip density was estimated to be close to 50 docks per mile. In addition, all of the resorts and campgrounds appear to be well used. The concentration of a large number of people in motor boats in such a narrow, sinuous part of the river has led to serious safety and noise problems in recent years. Lake Moovalya accounts for one-third of all boating accidents on the California side of the Colorado River. The Parker Strip is the most dangerous stretch of the river, particularly the area between Parker Dam and the Rock Palace. A majority of accidents on the Strip are collisions involving speedboats less than 20 feet in length with skiers in tow. These accidents are usually the result of improper or illegal skiing practices and carelessness.

Buckskin Mountain State Park in Arizona is within the Parker Strip and is the first public campground south of Parker Dam. The park has sheltered campsites, gasoline pumps for boats, a small store, a boat ramp and trailer spaces. Most visitors using the park are from the Los Angeles area, particularly during the summer. Summer use is largely power boating, water skiing, tubing, and swimming. The park has severe traffic congestion problems on holidays and on some summer weekends. The park also has severe safety hazards that generally result in one to two accidents a month. A number of factors are involved: (1) the park is located on a curve in the river; (2) the store sells alcoholic beverages legally to persons 19 years and older; (3) the gas station attracts boaters to cross over from the California side to fuel up; (4) there is no roped off swimming area; and (5) there are continual conflicts between people on inner tubes and those using jet skis and power boats.

Ah Villa County Park has camping spaces for tents and trailers, showers, a boat ramp, and a first aid radio station. Picnicking and camping are equally popular, with sightseeing the next most popular activity.

Mayflower County Park allows fishing, boating, camping, picnicking, and swimming, and includes a boat ramp and dock. It currently has 36 campsites and is being expanded with 154 more sites with electrical hookups. Park plans include channeling a pond into the river to create a beach and swimming area. Water skiing is the predominant activity in summer, with fishing predominating in the winter.

The Parker area also hosts numerous annual events both on land and water due to its climate and geographic location. The major boating event is the Parker Nine-Hour Enduro. Participants in this all-day marathon include 80 of the largest and fastest racing boats. The event is held in early March. February is the month slated for the largest off-road vehicle race which consistently draws over 300 entries. The four hundred mile course through desert washes has caused problems for the BLM. Annual inner tube events are also rapidly increasing in popularity and are held mainly in the summer season.

A report on outdoor recreation between Headgate Rock Dam and Palo Verde Diversion Dam that was prepared for the U.S. Bureau of Reclamation found that picnicking was the most popular activity in the area at the numerous private establishments. Camping was the second most popular, followed by swimming-related activities and motorboating. Most activity is concentrated in three main areas: (1) Headgate Rock Dam to the highway bridge in Parker; (2) the Big River and Deer Island sites; and, (3) Lost Lake to Palo Verde Diversion Dam. The visitors in winter are characteristically from the eastern United States, while summer visitors are typically from southern California.

SUBAREA C. BLYTHE TO THE MEXICAN BORDER. This section of the Colorado River is far less developed per mile than any of the upstream portions previously discussed. Development is clustered with vast sections of undeveloped land along the river between the concentrations. With the exception of Yuma, there is generally more development on the California side than on the Arizona side, which is in contrast to the areas studied further upstream. One of the reasons for this may be the presence of numerous public lands and recreation areas. This section includes Cibola and Imperial National Wildlife Refuges; Picacho State Recreation Area; Gillmore, Horace Miller, Peter McIntyre, and Palo Verde County Parks; and the Indians' Laguna Dam South Recreation Site. These areas foster mainly camping and boating uses that do not require the level of urbanization which exists upstream. The Laguna-Martinez complex has a number of resorts but nowhere in this section of the river is the development as dense as in some of the other upstream areas.

Tourism plays an important role in economic activities in the vicinity of Blythe and Ehrenberg. There are a number of private resorts and marinas, public picnic areas and parks. Blythe acts as the hub of most water-oriented activities in this area, with rock collecting playing a secondary role. The county parks absorb a good portion of the campers.

In addition to public parks, the Blythe/Ehrenberg area has numerous private recreational resorts and campgrounds. The Blythe Marina is a popular take-off point for fishermen, canoeists, and power boaters.

The river channel south of Palo Verde is flanked by numerous backwater and sidestream areas which are used for power boating, fishing, and skiing. The speed at which the motorized crafts dart in and out of the backwater areas causes safety hazards to other recreational users and the careless operation of power boats has induced numerous collisions both in the backwater and at their intersections with the main river channel.

Palo Verde Lagoon is popular with hunters and fishermen. One of the big attractions in Palo Verde is the frogging season, which is from June through November. Palo Verde County Park has a boat ramp into Oxbow Lake and is managed for quiet uses such as fishing and swimming; water skiing is not allowed. The Oxbow Marina, two miles south, has a launching ramp (power boating is allowed). One-day canoe trips out of Blythe end there and participants can be shuttled back to Blythe.

The portion of the Colorado River within Imperial County is used for boating, camping, boat racing, fishing, water skiing and canoeing. Most water skiing occurs along the main river channel and in the backwater and side streams between Imperial Dam and the southern end of the Imperial Wildlife Refuge. The County owns 80 acres of undeveloped land which was originally planned as Gilmore Camp County Park. However, the county does not plan any expansion of its park system on the Colorado River for several years and does not plan to build any more boat docks because of problems caused by the fluctuating water level.

The Cibola National Wildlife Refuge includes two private resorts at Walter's Camp and Walker Lake. A third resort, Mitchell's Camp, is located just outside the refuge south of Davis Lake. Mitchell's Camp is frequented mostly by senior citizens. Canoeing is the dominant water sport in the refuge.

Imperial National Wildlife Refuge abuts the Cibola National Wildlife Refuge on the south. It includes all of the Colorado River from the vicinity of Walker Lake to Martinez Lake, with the exception of Picacho State Recreation Area. Picacho includes 55 miles of open river and is accessible overland only by dirt roads. Picacho has a boat ramp, a boat marina and launching area, a store, 50 regular campsites and two group camps, one of which is accessible by boat. A section of the main river channel in the Imperial Wildlife refuge is closed to skiing which eliminates that area for usage and indirectly increases the density of water skiers in other areas of the river.

Recreation hazards in this area are presented by conspicuous fluctuations of the water level which can expose sandbars and snags one day, and completely submerge them the next.

The Martinez Lake Marina, approximately 80 miles downstream from the Blythe Marina, is the last convenient take-off and landing point for canoes

and is part of the BLM's Laguna-Martinez National Recreation Lands. It is also the southern boundary of the Imperial National Wildlife Refuge. There are numerous private developments within the recreation complex including stores which sell boating supplies, gas, and groceries; a campground; cafe; boat ramp; and rental boats.

The Squaw Lake-Senator Wash complex supplies boat launching facilities, camping, swimming, and day use areas. Few areas in the southernmost river segment can support water skiing. Senator Wash and Imperial Reservoirs are the two skiing areas provided by damming of the river along this reach.

In a recent U.S. Department of the Interior Study of visitor levels and participation patterns on the Colorado River below Davis Dam, the portion of the river between the old Adobe Ruin site and Imperial Dam was included in the Imperial Division. In that division, water-related activities were the most popular form of user activity, with motor boating comprising the largest group, followed in order by swimming, fishing, and water skiing. Camping and picnicking were found to be the most popular land-based activities. Access, use limitations, and development are the key factors in visitor use and participation. A majority of the participation originates within the Martinez Lake, Squaw Lake, Walter's Camp, and Picacho State Park sites. The majority of visitors are of three types: local residents, transient visitors, and southern California residents. Different areas within the division and different seasons attract varying percentages of each group.

Recreational use of the river between Imperial and Laguna Dam is limited, but centers upon the Mitty Lake Region which provides limited concessions and boating facilities. Land-based activities account for approximately three quarters of all activities in the area. Water-related activities are limited as the river in this section provides little opportunity for such activities. The major user group in this area is of the transient variety (i.e., those individuals who spend their time travelling, living in motor homes, travel trailers, and periodically migrating from one geographic area to another as the seasons change.

The portion of the Colorado River south of Laguna Dam has considerable fishing uses. There are very few recreational facilities and most recreational use, other than fishing, is inner tube floating. The Laguna Dam South Recreation Site on the California side of the river just below Laguna Dam, is used for camping and swimming. The Laguna Whitewater Course, an area between Laguna Dam and the Laguna Dam Recreation site, is used for whitewater kayaking and inner tube floating.

#### NOISE

Noise is, by definition, an undesirable sound and for analytical purposes it is assumed to decrease in desirability as intensity increases. Noise, in general, is sound which is composed of many frequency components of various loudness distributed over the audible frequency range. The human ear does not respond uniformly over the entire frequency range of audible sound. It is most sensitive to frequencies from 1,000 to 4,000 Hz and significantly less sensitive to frequencies at the low and high ends of the spectrum. Various

noise scales have been introduced to describe, in a single number, the response of an average human to a complex sound made up of various frequencies at different loudness levels. The most common and heavily favored of these scales is the A-weighted decibel (dBA).

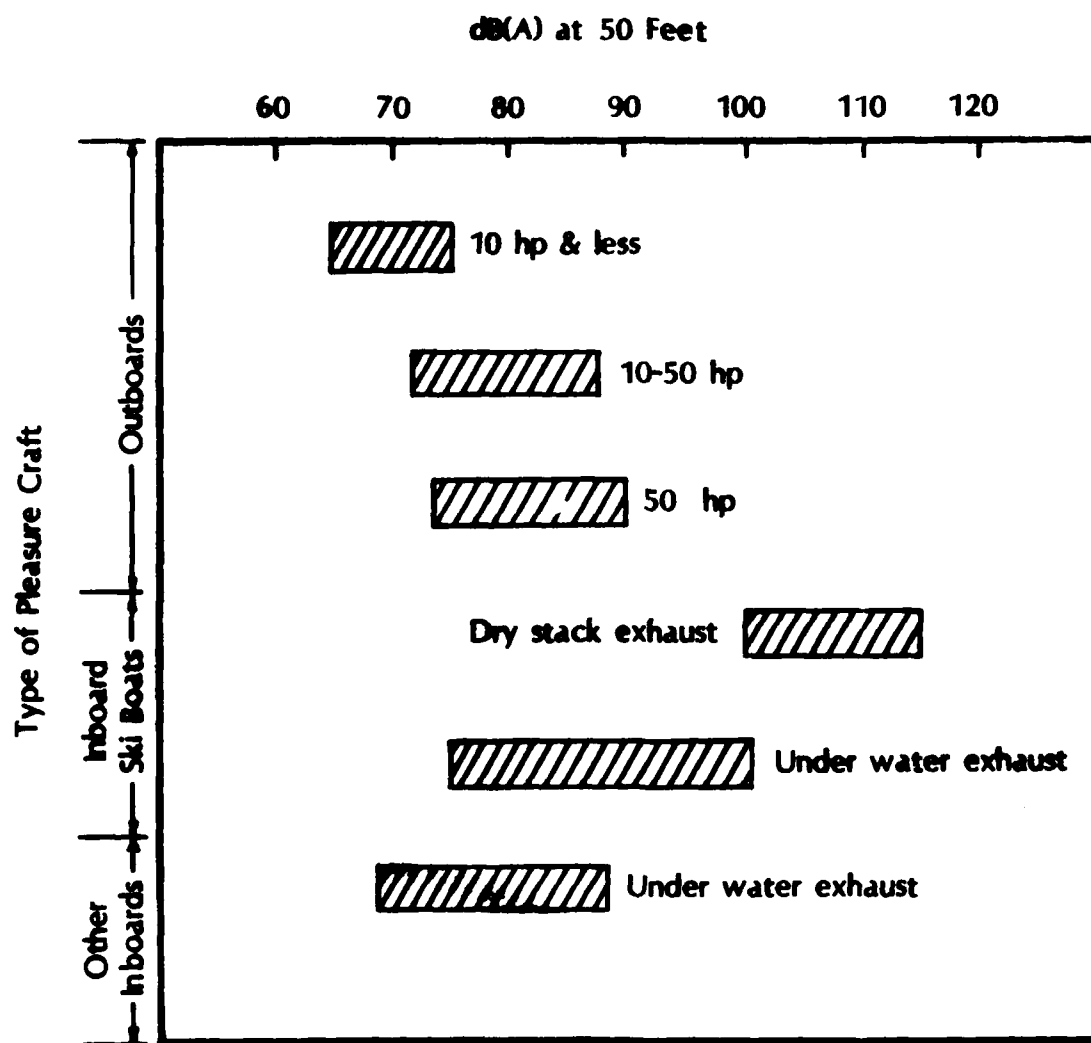
The location of a noise source, as it relates to the location of noise-sensitive use, is an important factor in determining the impact of the noise. Sound levels decrease, or attenuate, with distance according to physical laws of wave propagation. Roughly, there is a 6 dB decrease with each doubling of the distance between source and receptor. This is a conservative estimate based on simple spreading of energy, and it does not take into consideration absorption of sound by the atmosphere, topography or by vegetation. These additional factors are difficult to assess, however, without constructing detailed models. As water does not absorb sound very well, and in fact it may accentuate the noise level perception, a standard attenuation is assumed for water-based sources of noise described herein.

The majority of river shoreline is undeveloped and remote from intensive human activity. Minimal intrusions of vehicular or industrial noise occur except from infrequent off-road vehicle use or recreational boating. Background noise levels would therefore be expected to be in the 40 dB(A) range, perhaps slightly reduced at night.

In concert with the degree of recreational use, other areas of the river experience noise levels to the point of community annoyance, particularly during the summer season. At present, noise has been identified as a major problem along only two stretches of the river, Needles and Parker Strip. Both areas are popular for boating and water skiing and noise complaints are common due to the urbanized nature of shoreline and adjacent parcels.

Power boats are the major source of noise in the shorezone, with levels frequently approaching the maximum established noise level of 86 dB(A) at a distance of 50 feet. The enforcement of water exhaust mufflers and speed limitations are attempts at achieving noise reduction, however, many violations are still apparent. Figure 10 presents data on typical noise emissions from inboard and outboard pleasure boats of different types and engine sizes. Noise emissions for an engine of a particular size are a positive function of the speed at which the engine is operated. This implies that water skiing with speed boats generates considerably more noise than trolling from a boat moving at low speed.

The U.S. Department of Housing and Urban Development (HUD) has developed guidelines which relate acceptable noise levels to specific land use categories as shown in Figure 11. The intent of the noise standards is to prevent adverse health effects and preserve the quality of the residential, recreational, or natural environment. The Community Noise Equivalent Level (CNEL) is a time-average measurement which weights evening and night noise more heavily than that generated during the day. Thus, a single-event noise, such as that recorded when a motorboat passes a monitoring point would, if in proximity of sensitive receptors, create an annoyance or disturbance. However, when averaged with sound levels recorded at other times of the day, the time averaged (CNEL) sound level may or may not exceed the adopted sensitivity threshold of 65 dB.



Source: Transportation Noise and Noise from Equipment Powered by Internal Combustion Engines, EPA, Dec. 31, 1971.

Figure 8. Typical Pleasure Boat Noise Level Ranges(dBA at 50')

In addition to the measurable noise level of the sound itself, the orientation of the receptors with respect to the noise source is also a valid factor. In general, the presence of power boats along the river and lakes is not considered to create adverse noise impacts. Weekend recreationists frequenting areas of intensive boating use normally anticipate the associated noise and perceive it as part of the camping experience. However, established residents and passive recreationists (fishermen, backpackers, rafters, etc.) may be disturbed by sporadic or constant noise emissions. Therefore, a conservative representation of noise sensitive receptors for each river segment is provided below in order to more accurately quantify potential areas of impact.

#### Segment 1. Lee's Ferry to Davis Dam

Motorized boating in the Grand Canyon National Park has been restricted to certain annual periods due to the perceived disruption of the wilderness experience by other river users. Thus, this area is not considered as a potential receptor to noise accommodating projects applicable to the District's General Permit. The Lake Mead and Lake Mohave portions of the river have designated areas where motorized boating is prohibited, and complaints regarding noise are uncommon. In addition, as these two river segments under the National Park Service jurisdiction, it is anticipated that any shorezone improvements will be in conformance with established management plans for the area and therefore represent the public interest.

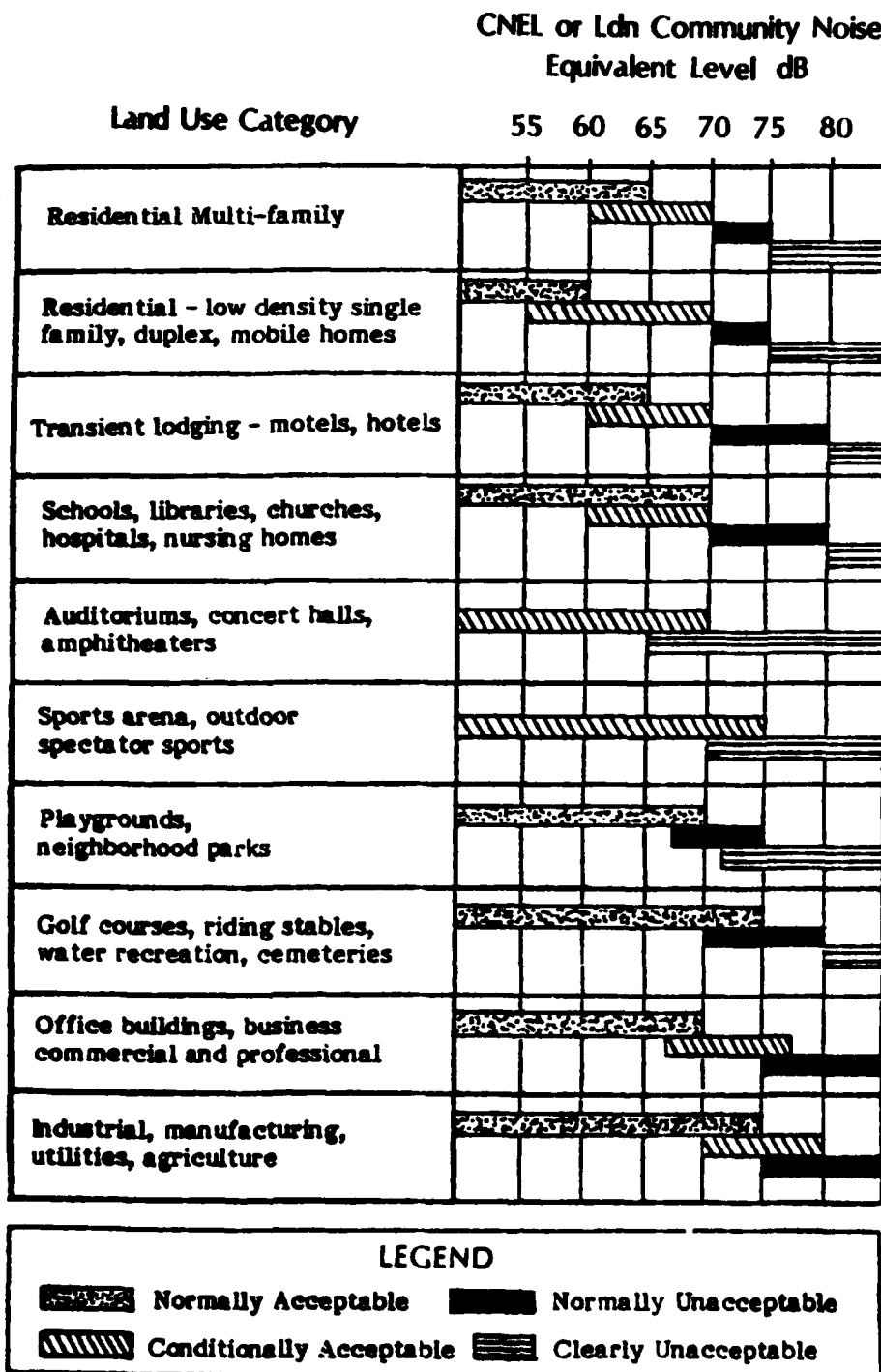
#### Segment 2. Davis Dam to the Mexican Border

SUBAREA A. DAVIS DAM TO PARKER DAM. Certain intensive recreational or boating areas are identified as noise-sensitive due to extensive urban or residential development along the shoreline. Existing noise levels at these locations are frequently in violation of the acceptable outdoor noise sensitivity level of 65 dB for residential uses, as established by the U.S. Department of Housing and Urban Development. The following areas within this segment would be applicable: Bullhead City (RM 272-273), Riviera (RM 269-270), Needles (RM 245-247), Havasu Palms (RM 204), and Havasu Springs (RM 190).

The Lake Havasu area is not particularly noise sensitive due to the primarily water-oriented recreational nature of the lake shore. Motorized boating tends to occur far enough away from shore at a distance sufficient to attenuate noise to an acceptable degree to receptors on shore.

The Topock Marsh and Lake Havasu Wildlife Refuges are considered sensitive receptors of sudden or prolonged noise, such as emissions from power boats, which may disrupt wildlife resulting in decreased nesting near shore, physiological stress, and the masking of important bird vocalizations conveying distress, alarm, territorial boundaries, mating, and care of the young. Critical periods are summer and fall, the seasons for mating and nesting. The temporal and distance factors of noise effects are not clearly understood, as some of the larger mammals may adjust rather quickly, whereas raptor species may be significantly disrupted.





Modified from: U.S. Dept. of Housing and Urban Development, 1972.

Figure 9. Land Use Compatability for Community Noise Environments

SUBAREA B. PARKER DAM TO BLYTHE. The area known as the "Parker Strip" (RM 175-192) is the most densely utilized segment of the river, and consequently experiences already high degrees of noise levels. Further potential for development of noise accommodating facilities warrants an evaluation of noise considerations.

The remainder of the river subsegment is Colorado River Indian Reservation lands. The sensitivity of this area is, in part, dependent upon the Indian perceptions of boating activity. The undeveloped character of these lands has led to a high level of usage for passive recreational activities such as canoeing. This, in addition to high wildlife densities may pose a sensitivity to noise levels.

SUBAREA C. BLYTHE TO THE MEXICAN BORDER. The riverfront residential development associated with the communities of Ehrenberg and Blythe has also been identified as noise-sensitive due to the intensity of boating activity already occurring in the area. Additional noise-sensitive areas are the passive recreation and wildlife habitat portions of the river, primarily Cibola Natural Wildlife Refuge (RM 57-99), Mittry Lake (RM 43-49), and the segment from the Laguna Dam to Yuma (RM 26-92). The intrusion of motorized boating in these areas could possibly disrupt the passive recreationists' experience of solitude and perception of an undisturbed environment.

## 8. SUMMARY OF IMPACTS OF ALTERNATIVES

### GENERAL PERMIT ALTERNATIVE

The General Permit would potentially allow the ultimate expansion of single-lot structures to maximum density. Areas most likely to attain high-density development are Bullhead City, Needles, and Parker. Those General Permit-authorized structures most likely to undergo proliferation under this alternative are individual boat docks. Maximum bulkhead or rip-rap development is not likely to occur as authorization is only granted to stabilizing structures constructed contiguous with existing rip-rap/bulkhead alignments. Beaches and community docks are not expected to attain high densities on the basis of past permitting trends.

The proposed areas of General Permit issuance were selected to avoid areas of maximum biological sensitivity. These areas were determined capable of supporting the maximum potential levels of permitted development without sustaining significant cumulative damages to biological and known cultural resources. Cumulative impacts to factors such as public safety, navigation and in some cases cultural resources were mitigated through restrictions and/or conditions included in the General Permit. Therefore, significant adverse cumulative impacts resulting from development under the General Permit are not expected to occur.

### NO-ACTION ALTERNATIVE

With a continuation of the current individual review procedures, proposed General Permit Areas would potentially attain maximum build-out without benefit of mitigation of cumulative impacts. General Permit areas were selected on the basis of their low biological sensitivities and therefore these resources would not be significantly impacted by maximum build-out. However, adverse impacts to navigation, public safety and recreation may result from permit issuance without regard to uniformity of structures and dimensional restrictions.

### PERMIT MORATORIUM ALTERNATIVE

A moratorium on permits would potentially lead to construction of some riparian improvements (e.g. bank stabilization and beaches) above the Ordinary High Water Mark and therefore outside of District's jurisdiction. Overall development and use of the river would probably not decrease under this alternative; therefore, these structures could potentially result in significant impacts on water quality and cultural resources. Without benefit of jurisdiction, the District would have no authority to control impacts or require mitigation.

## 9. CONCLUSIONS AND RECOMMENDATIONS

The Los Angeles District of the Corps of Engineers, acting under authority of the River and Harbor Act of 1899 and Clean Water Act of 1977 and in conformance with the policies and procedures established in 33 CFR 320-330, is undertaking the formulation of a General Permit for certain structures along portions of the lower Colorado River. The proposed General Permit is designed to alleviate problems inherent in the current individual review process. The major objectives of the General Permit are: (a) to expedite permit processing along the lower Colorado, and (b) to mitigate potential adverse cumulative impacts resulting from anticipated maximum levels of District-permitted development.

General Permit areas were designated on the basis of an evaluation of existing resources along the entire lower Colorado south of Lee's Ferry, Arizona. The General Permit is proposed for issuance only in those areas where constraints to cumulative development have been determined to be sufficiently low based on environmental and public interest factors.

A thorough environmental analysis of the proposed General Permit and two alternative actions was conducted, as documented in the attached EIS. The two alternatives examined are:

1. No-Action Alternative: all permits in the study areas would continue to be processed under existing individual review procedures.
2. Permit Moratorium Alternative: a moratorium on further permit issuance in the study area would be implemented.

A comparison of impacts of the three alternatives is displayed in Section 3.0 of the EIS. Overall, impacts of the No-Action and General Permit alternatives are similar. The Permit Moratorium alternative would result in substantially greater adverse impacts on public interest factors.

Expected levels of development under the No-Action and General Permit alternatives are largely the same, effecting a similarity in predicted cumulative impacts on biological resources. However, through the establishment of dimensional limitations on boat docks, the General Permit authorizes a uniform configuration of structures intended to minimize cumulative adverse impacts on navigation, recreation, and public safety. The General Permit also incorporates criteria for fill material designed to reduce cumulative impacts on water quality.

Of the No-Action and General Permit alternatives, the General Permit would have the greater administrative benefits. Issuance of the General Permit would immediately authorize construction following a 30-day notification period. This is in contrast to a minimum 90-day processing period under current procedures. Additionally, the General Permit precludes the need for future individual assessment for authorized structures, thereby obviating the need for individual site visits.

On the basis of comparison of environmental impacts and administrative benefits of the proposed alternatives, the General Permit alternative is recommended for implementation.

**APPENDIX A**  
**GENERIC IMPACTS OF STRUCTURES AUTHORIZED**  
**UNDER THE GENERAL PERMIT**

APPENDIX A: GENERIC IMPACTS OF STRUCTURES  
AUTHORIZED UNDER THE PROPOSED GENERAL PERMIT

WATER QUALITY MEASUREMENTS

A total of 10 water samples were taken and analyzed for a variety of chemical parameters. Sampling location and chemical data can be found in Table 1 of the Main Report text. Water samples were taken from the river, placed in sealed polyethylene containers and placed immediately in ice. All samples were kept at 4C until analyzed. The time from collection to analysis varied from 12 to 36 hours, depending upon collection time and distance to the laboratory.

Other measurement taken in the field include cross-sectional profiles of current speed, oxygen levels, temperature, conductivity/salinity, bottom type in sampling locations and current deflection around small scale in-stream projects. Typical profiles are presented in Figures A-1 to A-12.

The profiling of current speeds provided some significant information, particularly with regards to the air/water and bottom or bank/water interfaces. There is a significant reduction in surface water speeds attributable to the air/water interaction at the surface. Water velocity usually increased by 100 percent within 0.5 m to 2 m below surface. There is a "core" of fast flowing water even in sections that appear to be of moderate to slow flow. This "core" moves toward the outside bank in turns.

Areas near the shore and bottom exhibit extremely low flow rates. The flow rate increases over sandy substrates and decreases over gravel and cobbled substrates. Significant flow reduction occurs near the bank; particularly in areas of heavy riparian growth, and in some rip-rapped areas overgrown with vegetation. In the densely overgrown areas, flow reversal at 1 to 1.5 m from shore can be observed. These areas of slow and "no" flow often hold large numbers of juvenile and post-juvenile fishes of a variety of species.

The width of this zero flow zone increases and decreases in relation to the bank configuration. In beach areas, it is almost non-existent. This usually results in an increase in scouring of sand from the beach. As the water, laden with silt, enters the next bank form (usually vegetated) the near shore water slows and deposits sand, creating a sandbar immediately downstream from the beach. Sandbars are the usual result of manipulation of naturally vegetated banks, particularly below beaches, jetties, and bulkheads. Floating docks tend to have the effect of decreasing water flow near the bank and actually create zero flow zones in disturbed areas, thus increasing the suitable environment for juvenile and larval fish.

GENERIC ENVIRONMENTAL EFFECTS

Floating Docks or Docks on Piles

A floating dock generally has little negative effect on the aquatic environment. There is a minor amount of shading and the increased use by

boats could increase the potential of oil spills and grease deposition. Some positive impacts are provided by docks; these include nearshore flow alteration, shading and areas of refuge for juvenile fishes. In a river environment, minor fuel and oil spills are rapidly diluted by downstream flow, thus minimizing the effect. In reservoirs the potential for short term negative effects particularly from increased boat traffic is increased.

#### Cantilevered Docks

The cantilevered dock has the same general and minimal effects as a floating dock. However, it has none of the potentially positive effects of a floating dock, since it does not reduce flow speed or alter flow pattern near shore. Negative effects are the same as for floating or docks on piles.

#### Sand Beach

The construction of a beach on the main body of the river usually requires the removal of near shore vegetation and the regrading of the bank. As has been noted, water velocities near the bank increase and are more parallel to the bank. This tends to scour the beach and remove sand. This heavy sediment load is usually deposited immediately downstream from the beach as a small sand bar. The beach often has to be restored at frequent intervals to maintain its usefulness. The construction of beaches on reservoirs has little effect except for the removal of riparian vegetation.

#### Rip-Rap Slope

The installation of a rip-rap bank generally has a similar effect on water velocity as a heavily vegetated natural bank. Water velocity near the bank slows, often to zero, and provides slack water for a variety of fish species. The effect of a short section would be minimal; however several short sections in a row could create differential scouring patterns and lead to channel alterations. This could lead to change in bottom configuration, loss (or gain) of specific habitats suitable for fishes, and alteration of species composition. If the banks were revegetated quickly, the effect could be minimized substantially.

It can be seen that current reversal below the structure is significant. This always promotes sand deposition, sandbar development, and beach development. Jetties are occasionally used to protect beaches and several were noted upstream from boat launching ramps. The effect of this downstream alteration can be increased (or decreased) by the length of the jetty. It appears that the downstream effect is significant for a distance roughly equal to 4 to 5 times the length of the jetty.

#### Bulkheads

Bulkheads are usually built on the bank and rarely extend far out into the river flow. The construction of bulkheads has a profound effect on near-bank hydraulics. Flow near the bank becomes more linear, there is significant reduction in the zero flow zone and there is often substantial scouring action above and below the bulkhead. The bulkhead is useful in preventing erosion of



property, especially on the outside the turns where the river speed is increased. However, in that situation, more than one reach of bulkhead would be necessary, or the bank stabilized (rip-rap), to decrease the scouring effect downstream from the project area. Significant effects are associated with bulkhead development, with alterations in flow speed, deposition rates, and bottom configuration being most important. Fishes usually associated with zero flow zone would be forced to move into other areas and populations could be altered, especially with extensive bulkhead development.

Bulkheads in reservoirs or backwater areas would not create the effect of those on the midstream, though the loss of natural bank and bottom forms could have some impact on fish spawning and population maintenance. This impact, if present, should be of short duration and minimal.

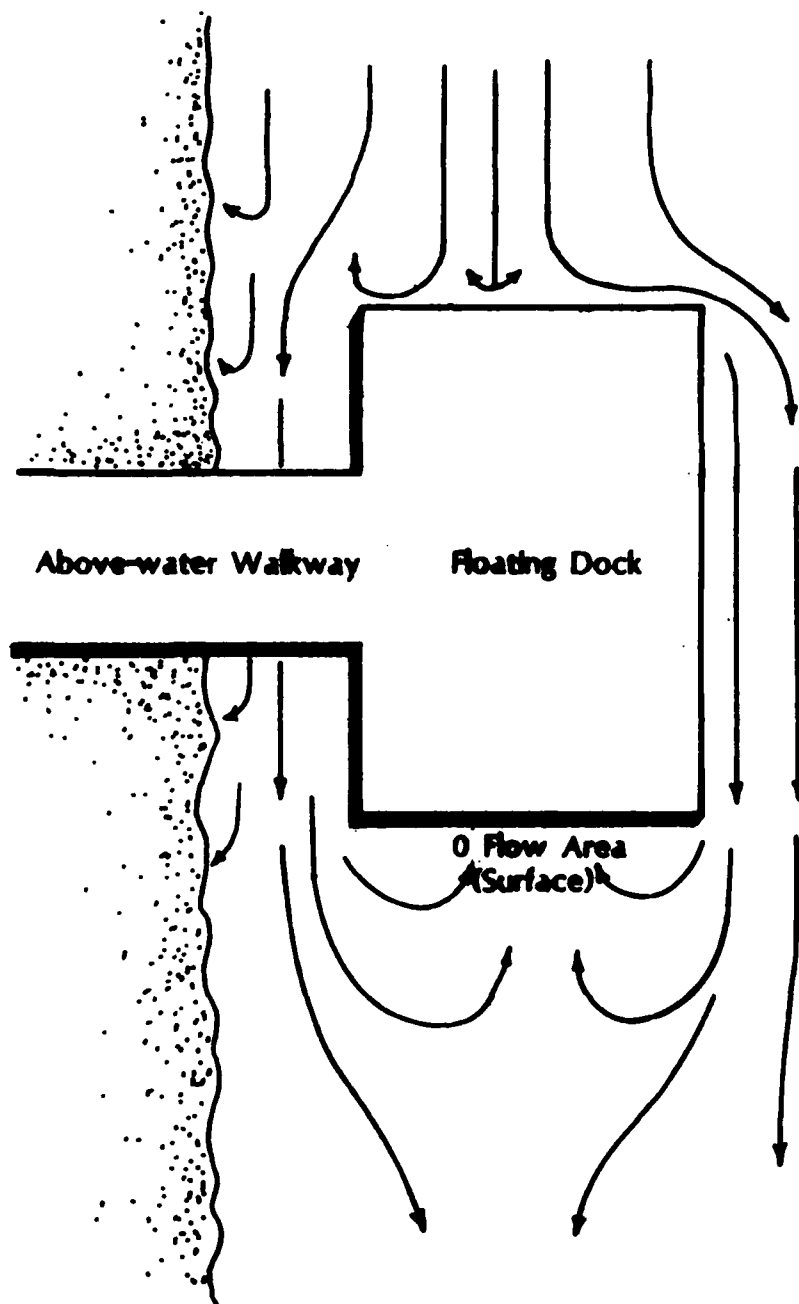
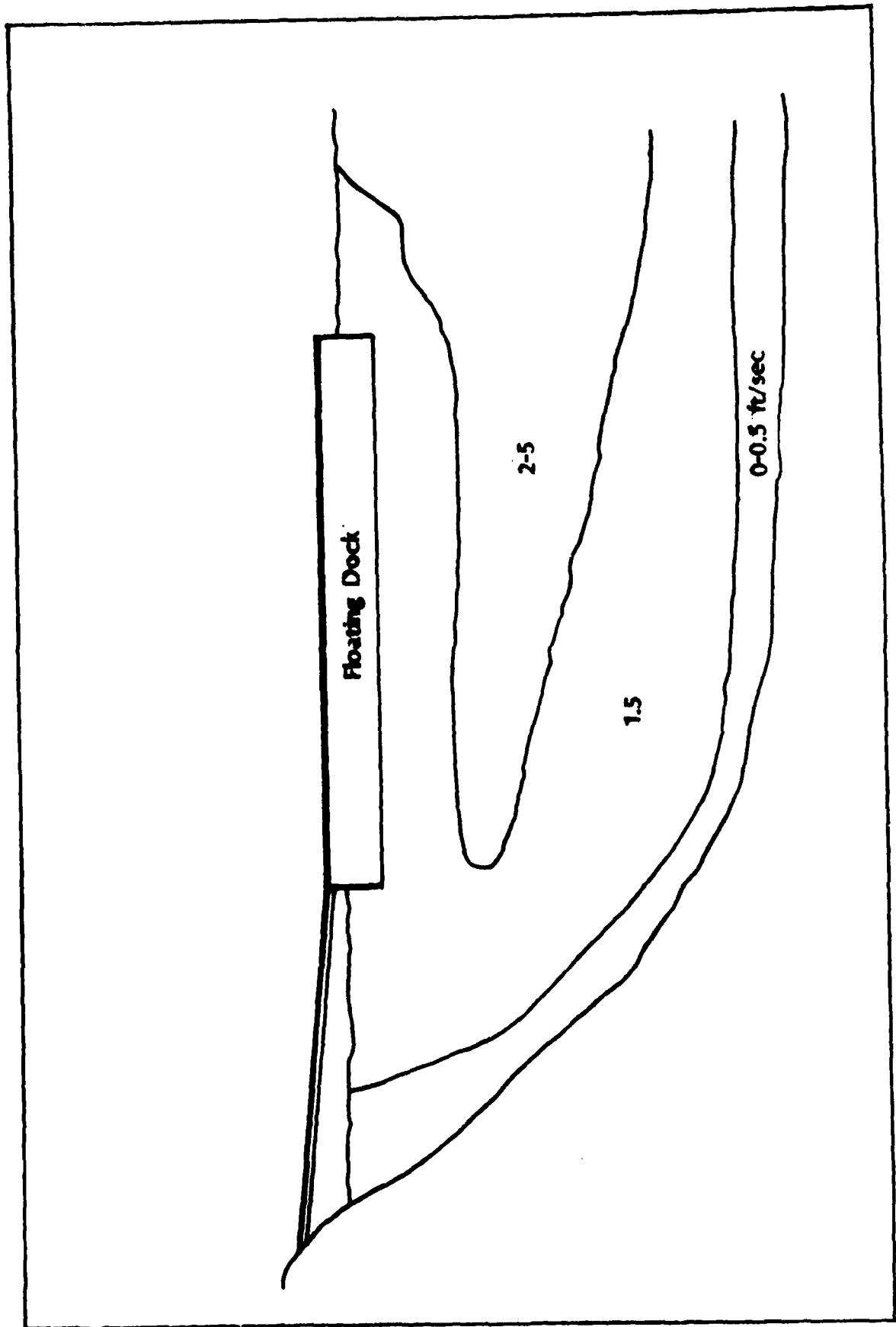


Figure A-1. Floating Dock



A-6

Figure A-2. Floating Dock Cross Section

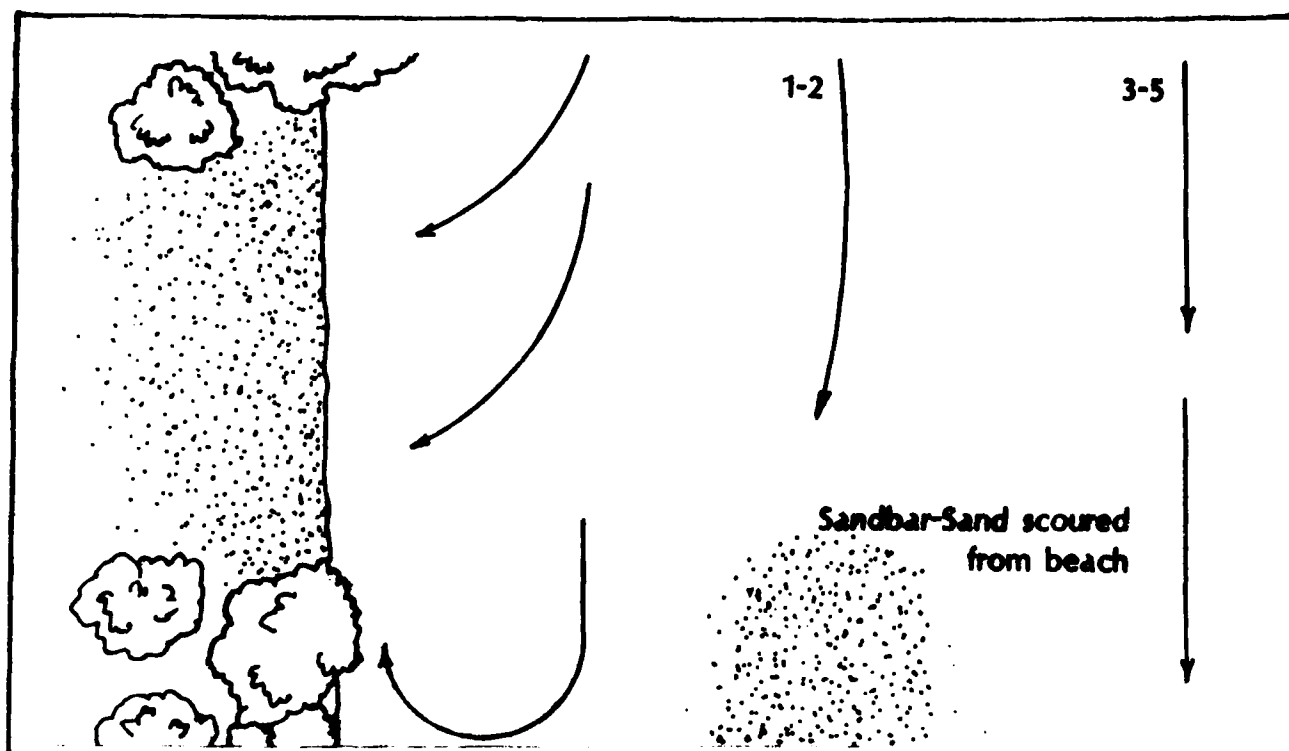


Figure A-3. Beach- Vegetation Removed

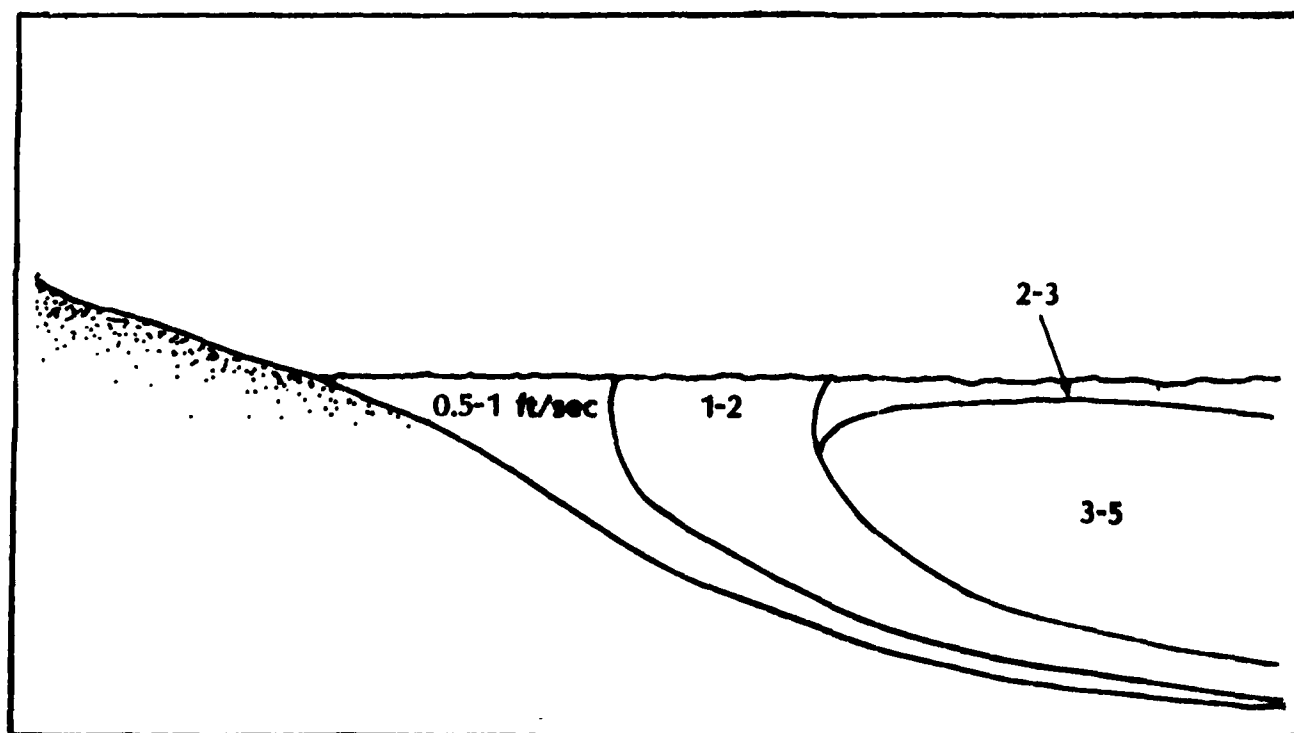


Figure A-4. Beach Cross Section

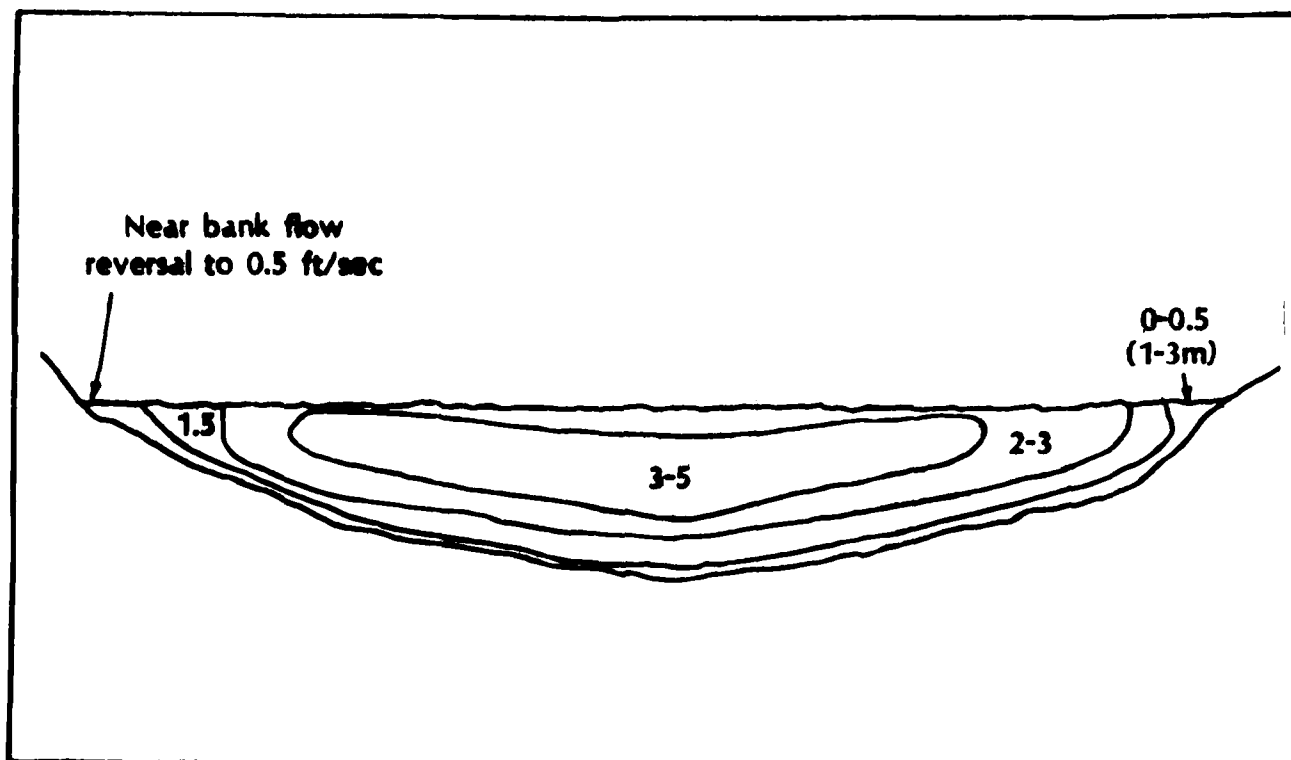


Figure A-5. Normal River Cross Section

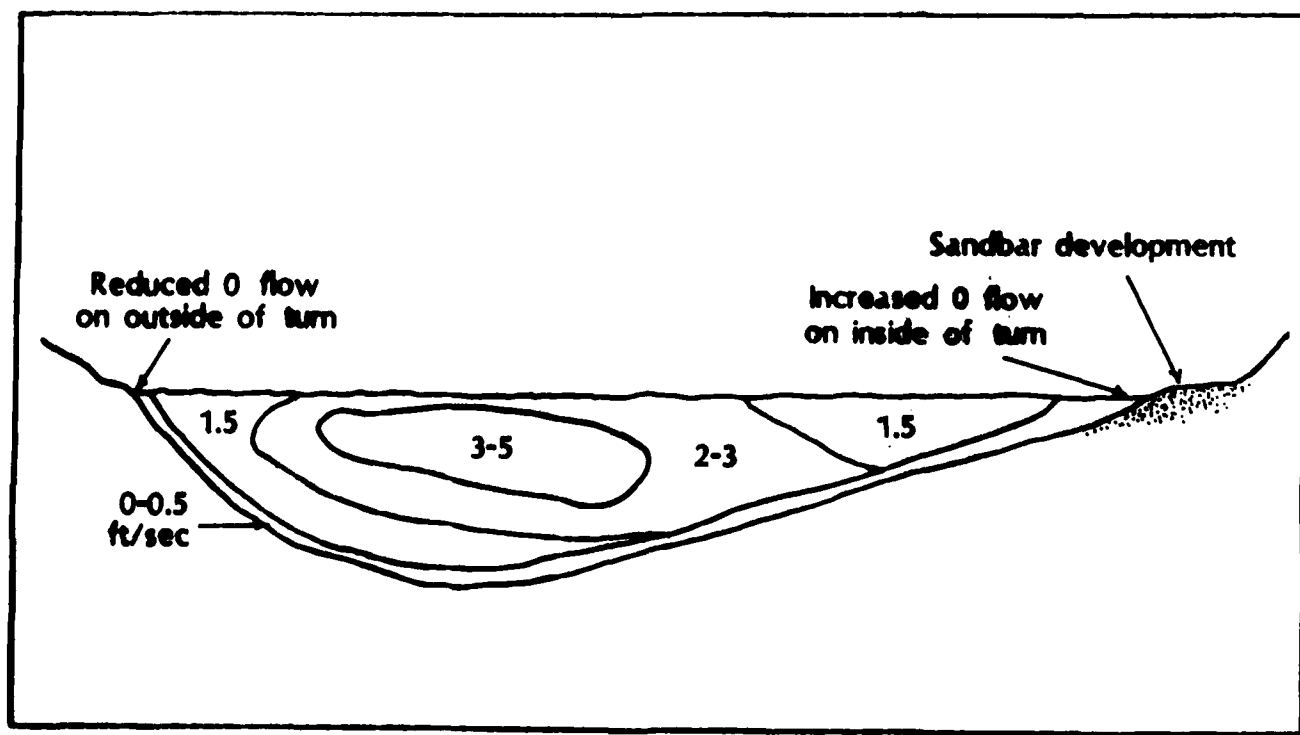


Figure A-6. River Bend Cross Section

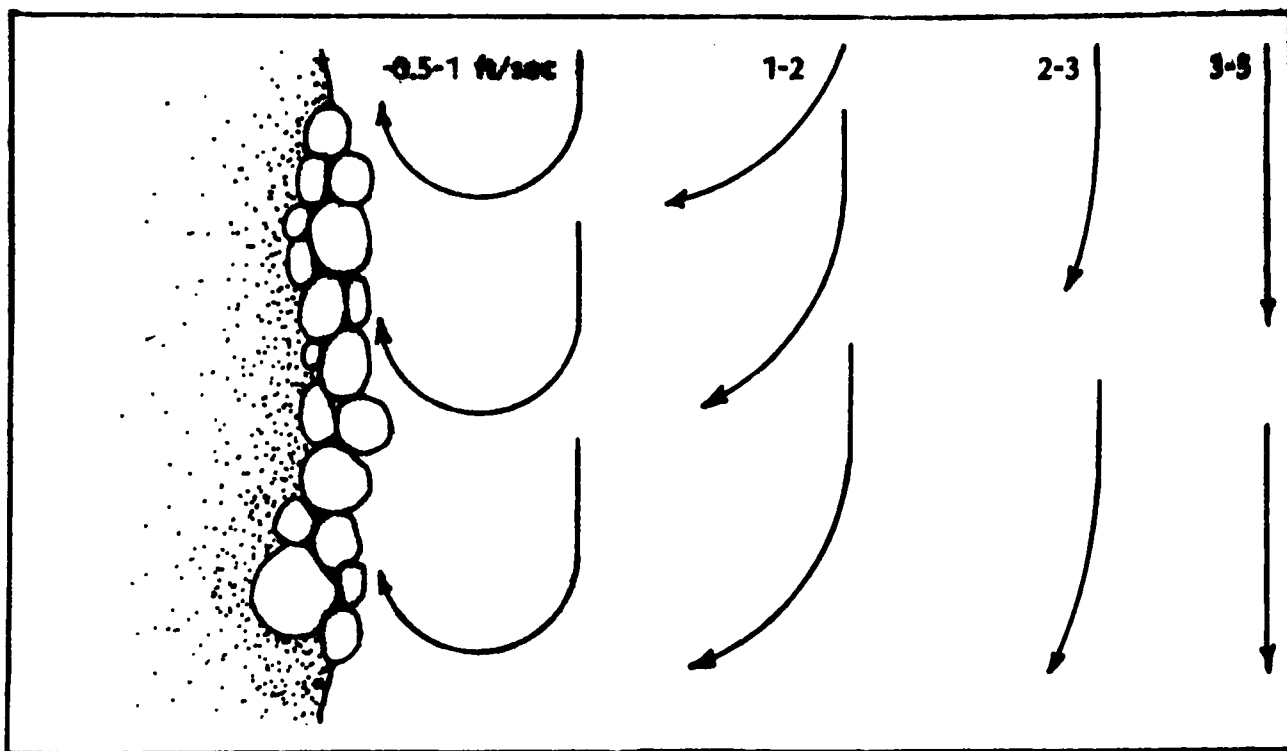


Figure A-7. Rip-Rap Bank

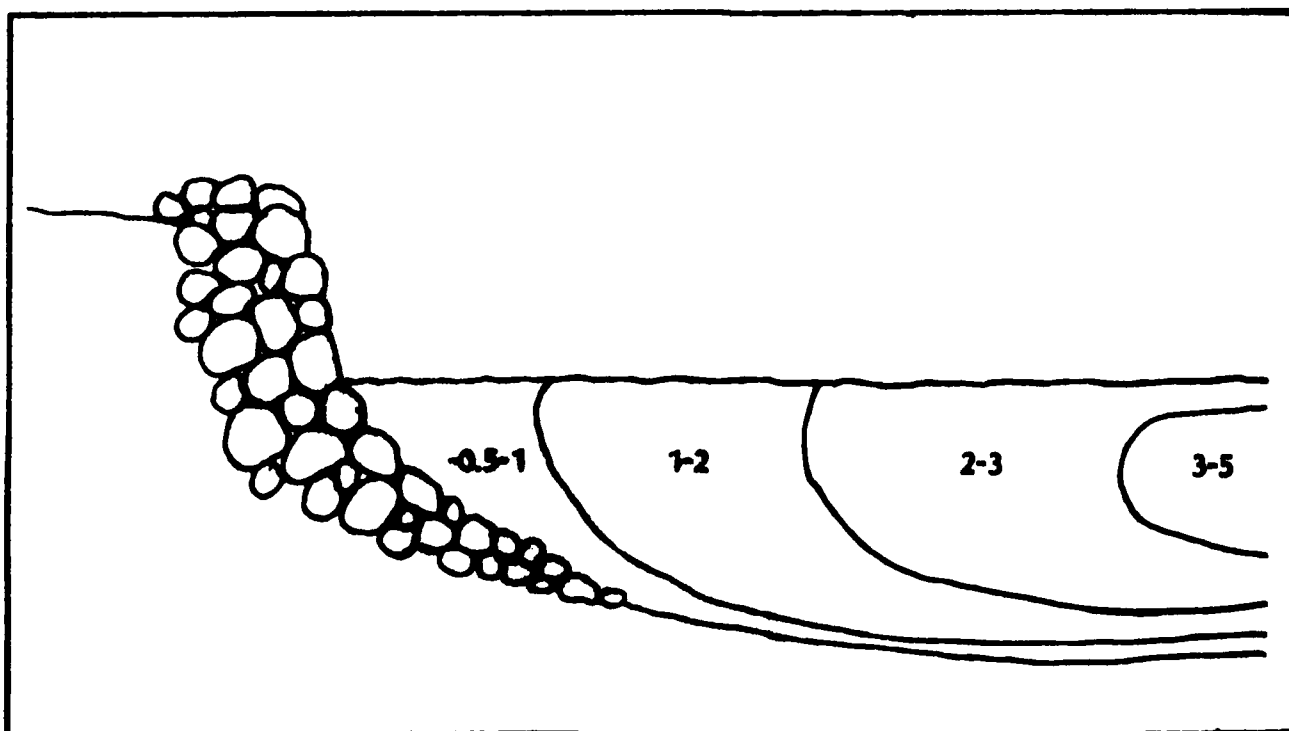


Figure A-8. Rip-Rap Bank Cross Section

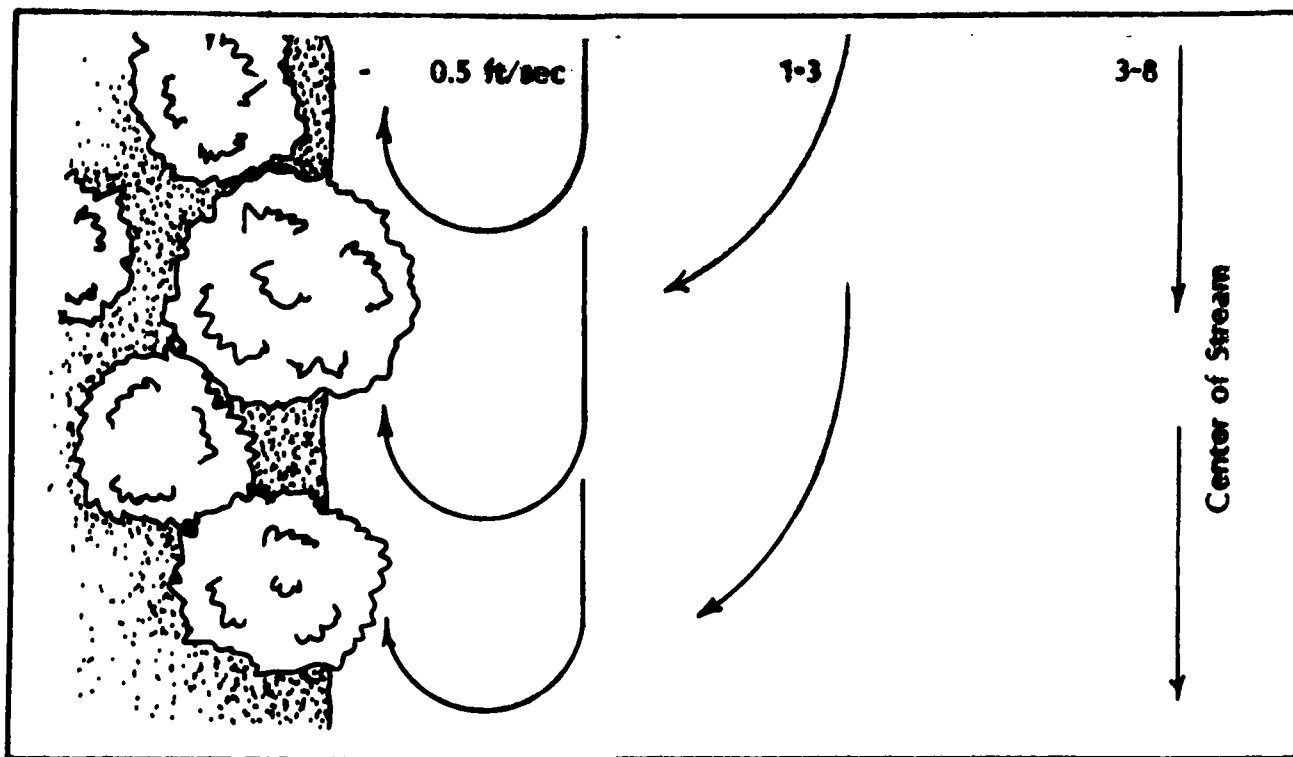


Figure A-9. Vegetation Stabilized Bank  
STABILIZED BANK

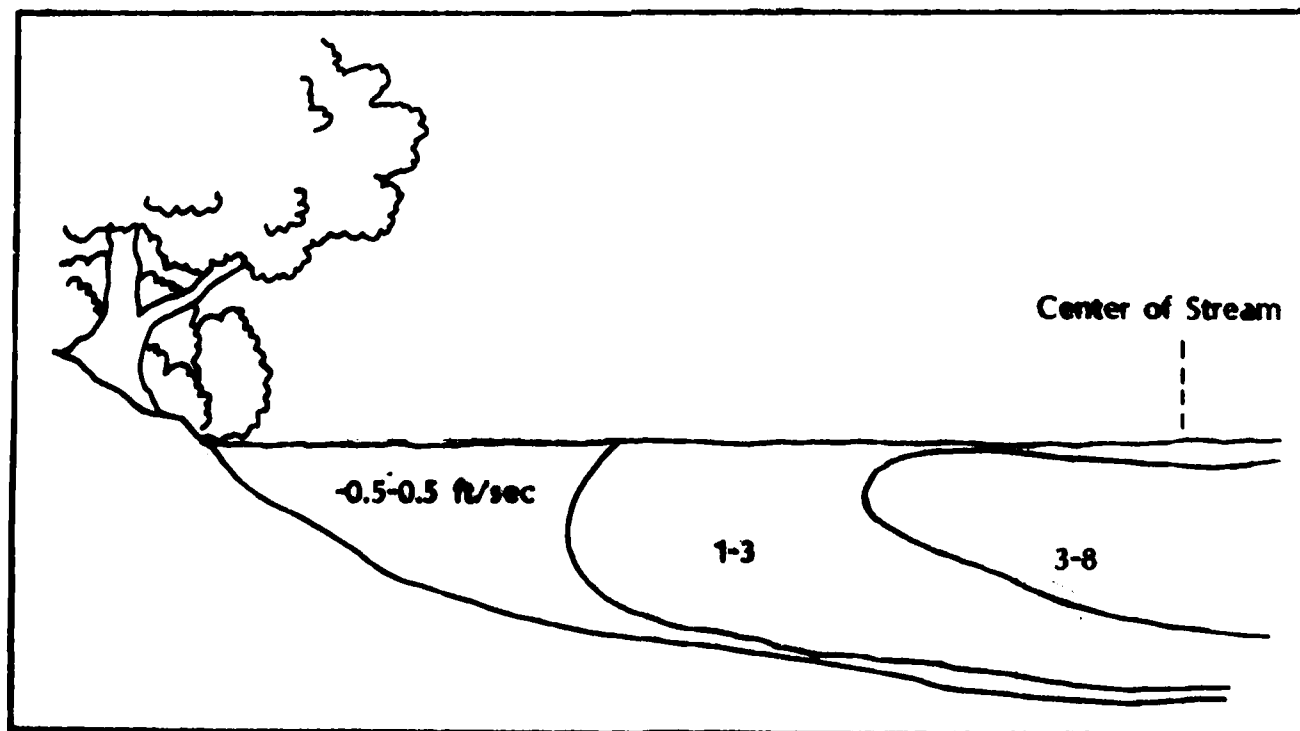


Figure A-10. Vegetation Stabilized Bank  
Cross Section

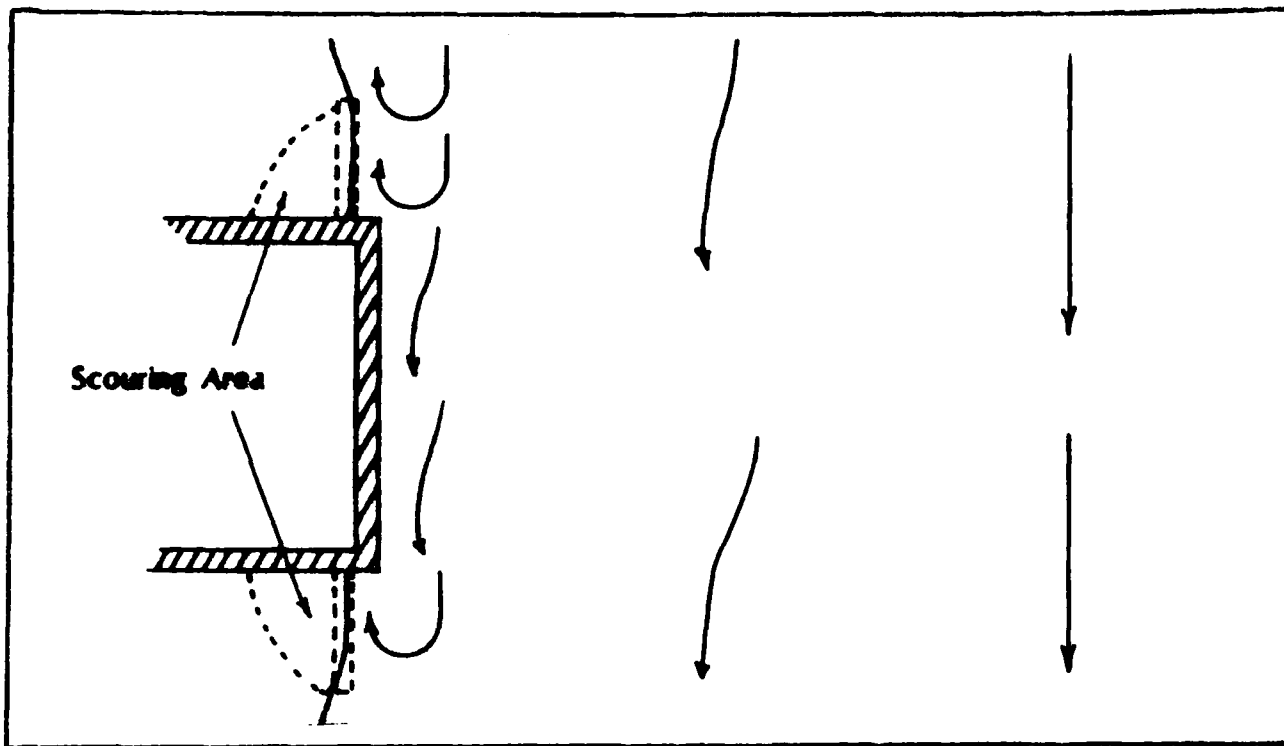


Figure A-11. Bulkhead

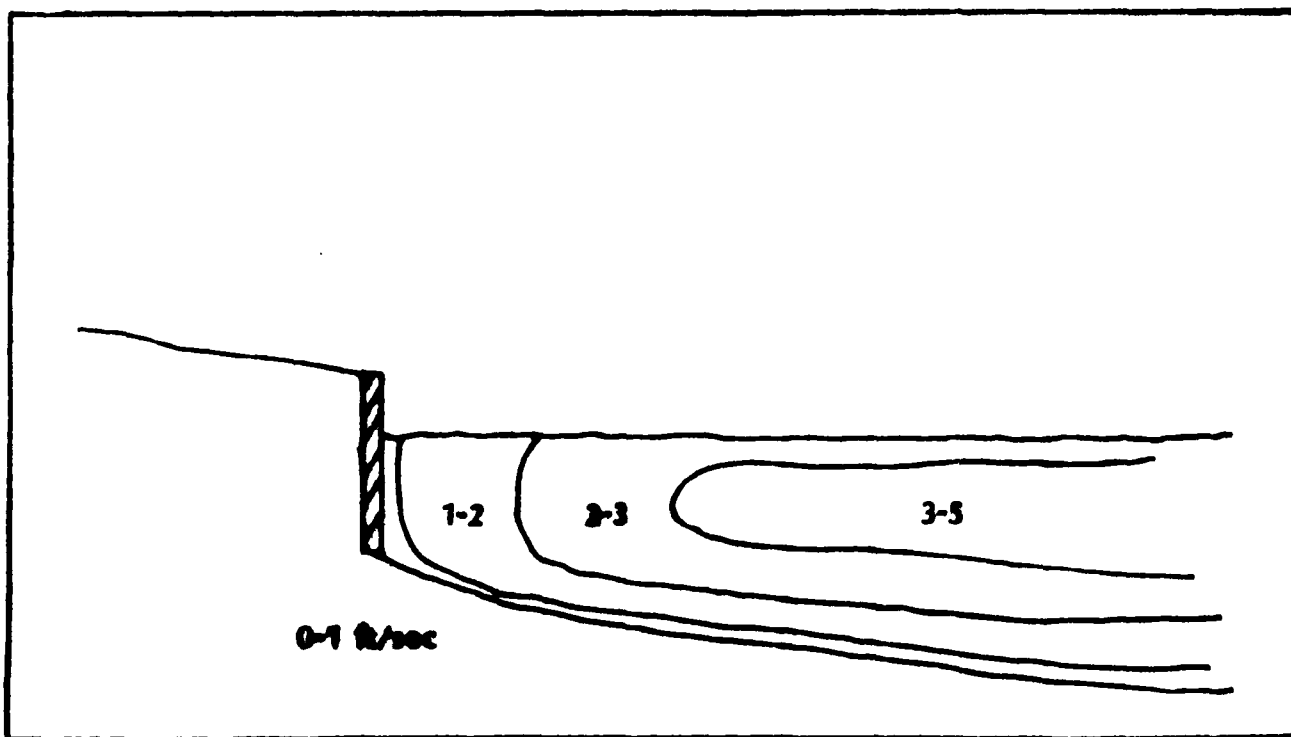


Figure A-12. Bulkhead Cross Section



## CUMULATIVE EFFECTS OF A NUMBER OF INDIVIDUALLY PERMITTED PROJECTS IN THE SAME AREA

### Floating Docks

The cumulative effect of a large number (10-20 in a row) of floating docks could be the substantial alteration of flow rates and flow character near shore. There would be a reduction in light, caused by shading of the docks, thus promoting benthic plant growth. Due to reduction in velocities, there would be increased deposition of silt and sand, possibly smothering the benthic organisms.

Some fish species are attracted to dock areas; while others are forced to move elsewhere. The increased human utilization around docks also promotes changes due to increased fishing pressure, oil and gas spills, and noise.

### Cantilevered Docks

The cumulative effects of a large number (10-20 in an area) of cantilevered docks would be the same as for floating docks, except the river flow would not be altered significantly.

### Beaches

The effect of beaches could be substantial. Increased erosion of beach material would probably occur and the beach would have to be replenished periodically. The eroded sand would create significant downstream bars, thus altering the flow characteristics and cross-sectional profile of the river.

Downstream effects would include burial of benthos, probable loss of fish spawning habitats, construction of stabilized bars, with permanent vegetation and fish species compositional changes.

Beach construction in reaches of the river where midstream maximum velocities exceed 3 ft/sec should be recommended against due to high scour rates in these high speed sections.

### Rip-Rap Slopes

Currently on the river there are extended sections of rip-rap banks. These areas are used extensively by fishermen and other recreational users. Many of these areas have revegetated and are now fairly natural in appearance. Numerous fish species utilize the zero flow zones in these areas. Spawning often occurs near the bank in these areas.

The impact of new large scale bank stabilization projects could be significant, particularly in short term impacts. Bank and stream bed configuration would be altered, sediment load increased, and downstream benthos buried.

### Bulkheads

Increased lengths of bulkheads would create higher stream velocities and an increased potential for sediment transport and scouring. Two hundred to three hundred feet of bulkheads along a fast flowing section of river could have significant effect on fish populations and stream characteristics. Increased channel velocities would favor species adapted to fast water and species composition would be altered.

**APPENDIX B**  
**REFERENCES**

APPENDIX B  
REFERENCES

AQUATIC BIOLOGY

- Beland, Richard D., 1953. The effect of channelization on the fishery of the Lower Colorado River. California Fish and Game 39(1):137-139.
- Broadway, James E., and Perry L. Herrgesell, Ph.D., 1978. A Limnological survey of the Lower Colorado river. June CDFG Region 5.
- Bryant, Gary L., 1977. Colorado River fish inventory. USDI. January 17.
- California Department of Fish and Game, 1978. At the crossroads 1978, a report on California's endangered and rare fish and wildlife. State of California, Resources Agency, Fish and Game Commission.
- Cole, Gerald A. and Dennis M. Kubley, 1976. Limnological studies on the Colorado River from Lee's Ferry to Diamond Creek. U.S. Department Commerce NTIS PH-267 736.
- Deacon, James E., and John R. Baker, 1976. Aquatic investigation on the Colorado River from Separation Canyon to the Grand Cliffs, Grand Canyon National Park. U.S. Department of Commerce NTIS PB-267 734, June.
- Everett, Lorne G., 1972. A mathematical model of primary productivity and limnological patterns in Lake Mead. Tech. Report. No. 13 on Natural Resource Systems, Department of Hydrology and Water Resources, University of Arizona, Tucson.
- Guenther, Herbert R., and James Romero, 1972. Lake Havasu aquatic impact study. Progress Report. 1972. USDI. Bur. Rec.
- Holden, Paul B., and Clair B. Stalnaker, 1975. Distribution and abundance of mainstream fishes of the middle and upper Colorado River basins, 1967-1973. Trans. Amer. Fish Soc. 104(2):217-231.
- Marshall, C.W., 1976. Inventory of fish species and the aquatic environment of fifteen backwaters of Topock Gorge Division of the Colorado River. Inland Fish Br., Admin. Rept. 76-4 Sept.
- Minckley, W.L., 1973. Fishes of Arizona. Arizona Game and Fish Department, Sims Printing Company, Inc., Phoenix.
- Minckley, W.L., 1975a. An inventory of the aquatic ecology of the Colorado River: II. Limnotherope Division and other aquatic habitats of the Yuma Valley in August-September 1974. Bur. Rec.
- Minckley, W.L., 1975b. An inventory of the aquatic ecology of the Colorado River: III. Palo Verde Division in January-April 1975. Bur. Rec.

- Minckley, W.L., 1976. Aquatic habitats and fishes of the Lower Colorado River, final report. Bur. Rec. Contract No. 14-06-3002-529.
- Minckley, W.L., 1979. Aquatic habitats and fishes of the Lower Colorado River. Final Report Bur. Rec. Contract #14-06-3002-529.
- Minckley, W.L. and Dean W. Blinn, 1976. Summer distribution and reproductive status of fish of the Colorado River and its tributaries in Grand Canyon National Park and vicinity during 1975. Tech Report. No. 14, National Park Service, Grand Canyon National Park
- Minckley, W.L., and Randy M. McNatt, n.d. Fishes of Hunter's Hole, Yuma County, Arizona. Arizona State University, Tempe.
- Ponder, G.W., 1975. Inventory of fish species and the aquatic environment of sixteen backwaters of the Imperial Division of the Colorado River. Inland Fisheries Admin. Rept. No. 75-3. Calif. Dept. of Fish and Game, 87 pp.
- Prenkti, R.T., L.J. Paulson, and J.R. Baker, 1981. Chemical and biological structure of Lake Mead sediments. Tech. Rpt. No. 6, Lake Mead Limnological Research Center. University of Nevada, Las Vegas 89 pp.
- United States Department of Interior, 1975. Quality of water, Colorado River basin. Prog. Report No. 7, January.
- Wallis, Othello L., 1951. The status of the fish fauna of the Lake Mead National Recreational Area, Arizona-Nevada. Trans. Amer. Fish Soc. 80:84-92.

#### TERRESTRIAL BIOLOGY

- Carothers, S.W., S.W. Aitchison, M.M. Karpiscak, G.A. Ruffner, N.J. Sharber, P.L. Shoemaker, L.E. Stevens, M.E. Theroux, and D.S. Tomko, 1976. An ecological survey of the riparian zone of the Colorado River between Lee's Ferry and the Grand Wash Cliffs. Colorado River Technical Report No. 10, Grand Canyon National Park, 251 pp. (NTIS Access. No. PB 267770 AS).
- Holland, J.S., W.E. Niles, and P.J. Leary, 1979. Vascular plants of the Lake Mead National Recreation Area. Lake Mead Technical Report No. 3. National Park Service/University of Nevada, Las Vegas No. 008/13, 244 pp.
- Ohmart, R.D., and B. Anderson, 1974. Vegetation management annual report. Bureau of Reclamation Report, 55 pp.
- Ohmart, R.D., W.O. Deason, and S.J. Freeland, 1975. Dynamics of marsh land formation and succession along the lower Colorado River and their importance and management problems as related to wildlife in the arid southwest, Trans. 40th N. Amer. Wildl. Nat. Res. Conf. pp240-251.
- U.S. Department of Interior, 1980. California Desert Plan. Bureau of Land Management.

Vitt, L.J. and R.D. Ohmart, 1978. Herpetofauna of the lower Colorado River: Davis Dam to the Mexican Border. West. Found. Vert. Zool. 2:35-72.

#### CULTURAL RESOURCES

U.S. Army Engineer District, Los Angeles Corps of Engineers, 1981.  
Preliminary Environmental Resources Inventory Report, Vols I and II.

#### DEMOGRAPHICS

Arizona Commission of Indian Affairs, "Annual Report", 1980.

Greedy, G.W., Cheatham, G.W., et al, 1979. A Comparison of Study Year Data of Divisional Outdoor Recreational Use on the Colorado River, 1974-1978. Prepared for the Bureau of Land Management.

#### AIR QUALITY

Council on Environmental Quality. Environmental Quality - The First Annual Report of the Council on Environmental Quality. Transmitted to Congress, August 1970.

#### RECREATION

U.S. Department of Interior, Bureau of Land Management, 1980. Parker Strip Recreation Management Plan.

National Park Service, Grand Canyon National Park, U.S. Department of Interior, 1981. Draft Alternatives for the Colorado River Management Plan.

#### LAND USE

Citizens Task Force on In-Lieu Selection, 1980. Final Report: Guidelines and Criteria, January.

Ferrier, Gary, 1981, Wildlife Habitat Planner, Bureau of Land Management, Yuma District Office, telephone conversation, June 12.

Kibbler, Cheryl, 1981. Planning Commission Secretary, City of Needles, telephone conversation, May 5, 1981.

**FINAL  
ENVIRONMENTAL IMPACT STATEMENT  
Lower Colorado River  
Proposed General Permit  
Lee's Ferry, Arizona to the Mexican Border**

**Responsible lead agency: U.S. Army Engineer District, Los Angeles**

**Abstract:** The Los Angeles District has investigated public and agency concerns over the operation of the Corps of Engineer's regulatory permit program along the lower Colorado River. The primary concerns were found to be the long time periods required for permit processing and the inadequate consideration of cumulative environmental impacts during the permit review process. Three alternatives were selected for detailed study.

The General Permit alternative would designate certain areas along the river, based on sensitivity ratings for aquatic and terrestrial biology, cultural resources, recreation/public safety, and land use, as General Permit areas. Within these General Permit areas, certain types of construction meeting the General Permit's specified requirements would be automatically authorized without requiring an Individual Permit review. The General Permit proposal would reduce the processing time required to issue a permit and would mitigate cumulative environmental impacts. The Permit Moratorium alternative, consisting of a moratorium on further issuance of permits within the study area, would virtually eliminate permit processing time requirements. Some adverse cumulative impacts would occur as a result of potential construction of beaches or stabilization structures above the Ordinary High Water Mark (outside Corps jurisdiction). The No-Action alternative, consisting of maintaining the existing Individual Permit review process, would continue to require long time periods for permit processing and would not adequately address cumulative environmental impacts.

The General Permit proposal has been recommended for implementation based on its performance in addressing the identified public concerns and its ability to best serve the public interest.

Send your comments to the  
Commander by  
14 May 1982

If you would like further information on this  
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LOWER COLORADO RIVER PROPOSED GENERAL PERMIT

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## 1.0 SUMMARY

1.001 MAJOR CONCLUSIONS AND FINDINGS. The Los Angeles District Corps of Engineers (the District), acting under authority of the River and Harbor Act of 1899 and Clean Water Act of 1977 and in conformance with the policies and procedures established in 33 CRF 320-330, is undertaking the formulation of a General Permit for certain structures along portions of the lower Colorado River. The proposed General Permit is designed to alleviate problems inherent in the current individual review process. The major objectives of the General Permit are: (a) to expedite permit processing along the lower Colorado, and (b) to mitigate potential adverse cumulative impacts resulting from anticipated maximum levels of District-permitted development.

1.002 A thorough environmental analysis of the proposed General Permit alternative and two additional alternatives are documented herein. The two additional alternatives examined are:

a. No-Action Alternative: all permits in the study areas would continue to be processed under existing individual review procedures.

b. Permit Moratorium Alternative: A moratorium on further permit issuance in the study area would be implemented. A comparison of impacts of the three alternatives is displayed in Section 3.0 of this EIS.

1.003 General Permit Alternative. The General Permit alternative would potentially allow the ultimate expansion of single-lot structures to the maximum density situation. Areas most likely to attain high-density development are Bullhead City, Needles, and Parker Strip.

1.004 The proposed areas of General Permit issuance were selected to avoid areas of maximum biological sensitivity and known cultural resources. Cumulative impacts to factors such as public safety, navigation and in some cases cultural resources were mitigated through restrictions and/or conditions included in the General Permit. Therefore, significant adverse impacts resulting from cumulative development under the General Permit is not expected to occur.

1.005 No-Action Alternative. With a continuation of the current individual review procedures, land currently proposed for issuance of the General Permit would potentially attain maximum build-out without benefit of mitigation of cumulative impacts. Adverse impacts on navigation, recreation and public safety may result from permitting without regard to uniformity of structures or dimensional limitations.

1.006 Permit Moratorium Alternative. A moratorium on permits would potentially lead to construction of some riparian improvements (e.g. bank stabilization and beaches) above the Ordinary High Water Mark and therefore outside the District's jurisdiction. Without benefit of jurisdiction, the District would have no authority to control impacts or require mitigation.

1.007 On the basis of comparison of environmental impacts and administrative benefits of the proposed alternatives, the General Permit alternative is recommended for implementation.

1.008 AREAS OF CONTROVERSY. During the course of study, two areas of concern frequently have been voiced by interested agencies and the public. One concern of the public is the protracted time period required for processing of District and other permits for facilities such as boat docks on the Colorado River. Agencies such as the U.S. Fish and Wildlife Service (USFWS) have expressed concern that implementation of a General Permit may not be sensitive to cumulative impacts.

1.009 The public cited delays in obtaining a permit as the primary concern pertinent to the District's jurisdiction. Property owners complained of receiving confusing and contradictory instructions from the Los Angeles District office of the Corps when seeking information on the application procedure. These and other unexplained delays (e.g. lengthy processing time) constituted the main source of dissatisfaction, although disapproval was also expressed over the recently enacted District policy of placing applications for some individual boat docks in abeyance pending completion of the Environmental Impact Statement.

1.010 The proposed action will have the effect of reducing permit processing time from the current minimum of 90 days to a 30-day period for those projects and areas covered by the General Permit. Projects and areas not covered by the proposed General Permit may still experience processing delays.

1.011 Agency comments in response to the preliminary proposal for a General Permit included concern that the General Permit would result in cumulative impacts on important physical, biological and cultural resources. Some agencies contended that the more heavily used areas of the River, such as the Parker Strip, have already been impacted to the maximum extent acceptable and should be closed to further installation of private structures.

1.012 The proposed General Permit has responded to these concerns in two ways. First, the General Permit has been designated on the basis of resource sensitivity analyses. Second, the General Permit includes specific provisions to mitigate potential impacts which could occur as a result of size of structures, materials or location of structures.

1.013 UNRESOLVED ISSUES. Many of the concerns voiced during the public meetings involved aspects of river management outside of District authority. Speakers repeatedly expressed dissatisfaction with the patrolling capability of the Coast Guard, the problem of pollution generated by river users in the form of litter and waste discharges directly into the river, and the effects of present and anticipated flood control releases from Bureau of Reclamation reservoirs. The repeated emphasis of these concerns points to an issue in itself: the confusion brought about by the phenomenon of numerous and overlapping authorities on the River. This confusion has promoted delays in the procurement of permits by property owners.

1.014 In spite of the proposed General Permit, the jurisdictional setting of the Colorado River will continue to be complex and confusing.

1.015 RELATIONSHIP TO ENVIRONMENTAL STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS. The relationship of the proposed General Permit and alternatives to applicable statutes and regulations, and the degree to which those statutes have been complied with to date are displayed in Table 1.

Table 1. Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements  
Proposed General Permit Lower Colorado River

	No Action Alternative	Proposed General Permit Alternative	Permit Moratorium Alternative
<b>Federal Statutes</b>			
<u>Antiquities and Historic Preservation Act, as amended, 16 U.S.C. 469 et seq.</u>	Partial	Full	Partial
<u>Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1361 et seq.</u>	Partial	Full	Non
<u>Endangered Species Act, as amended, 16 U.S.C. 1531 et seq.</u>	Partial	Full	Partial
<u>Fish and Wildlife Coordination Act, as amended, U.S.C. 661 et seq.</u>	Partial	Full	Full
<u>National Historic Preservation Act, as amended, 16 U.S.C. 700 et seq.</u>	Partial	Full	Partial
<u>National Environmental Policy Act, as amended, 42 U.S.C. 4321 et seq.</u>	Partial	Full	Full
<u>River and Harbor Act, 33 U.S.C. 401 et seq.</u>	Partial	Full	Partial
<u>Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.</u>	N/A	N/A	N/A
<b>Executive Orders</b>			
<u>Protection of Wetlands (E.O. 11980)</u>	Full	Full	Partial
<u>Wild and Scenic River Nationwide Inventory (Presidential Directive August 1979)</u>	Partial	Partial	Partial
<b>State and Local Policies</b>			
<u>California Environmental Quality Act (Cal Public Resources Code, Division 13)</u>	Full	Full	Partial
<u>California Department of Fish and Game (1601, 1603 permit process)</u>	Partial	N/A	N/A
<b>Land Use Plans</b>			
<u>Farmer Strip Recreation Management Plan (BLM)</u>	Full	Full	Full
<u>Leguna Marinas Recreation Management Plan (BLM)</u>	N/A	Full	Non
<u>Grand Canyon National Park Natural Resource Management Plan (NPS)</u>	N/A	N/A	N/A

NOTES:

- The compliance categories used in this table were assigned based on the following definitions:
  - Full compliance - All requirements of the statute, E.O., or other policy and related regulations have been met.
  - Partial compliance - Some requirements of the statute, E.O., or other policy and related regulations remain to be met.
  - Noncompliance - None of the requirements of the statute, E.O., or other policy and related regulations have been met.
  - Not Applicable - N/A statute, E.O., or other policy not applicable.
- Statutes and plans entered in the table are currently in effect or adopted. Plans undergoing revision have not been included.

## 2.0 NEED FOR AND OBJECTIVES OF ACTION

2.001 STUDY AUTHORITY. The District has authority over all projects involving dredging or filling within the Colorado River, or construction over or within the river and its adjacent wetlands. Regulation is authorized by Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act of 1977. The instrument of the District's authorization is a permit or Letter of Permission. The policies and procedures of the District's permit function are established in Title 33 CFR 320-330. A provision contained within this section enables the Commander to issue a General Permit (such as that proposed for activities on the lower Colorado River) which are substantially similar in nature and will cause only minimal adverse environmental impacts when performed separately, or result in minimal adverse cumulative effects upon the environment. Upon issuance of a General Permit, all activities meeting the criteria of the permit would be approved and would not require the issuance of Individual Permits. The regulations state that the General Permit may be revoked if it is determined that the cumulative effects of the activities authorized by it will have an adverse impact on the public interest. Following revocation, application for any future activities in areas covered by the General Permit would be processed as applications for Individual Permits. The General Permit currently under consideration for designated segments of the Colorado River between Lee's Ferry and the Mexican Border is presented in Appendix A of the EIS. The General Permit is summarized under Chapter 3.0 of the EIS.

2.002 PUBLIC CONCERNS. Under the current Individual Permit process, numerous small individual projects along the Colorado River (e.g. boat docks) are assessed separately, each requiring a site visit to determine existing environmental conditions and predicted impacts. The bulk of permits processed and the need for individual site visits has led to frequent delays in processing. Case-by-case review has proven inadequate in the assessment of cumulative impacts. To alleviate these processing concerns, the District has undertaken the formulation of a General Permit for specific individual structures in designated areas along the lower Colorado River. A complete discussion of problems with the current system is presented in Section 2 of the Main Report under "Problem Identification."

2.003 Public comment was initially solicited through two public meetings held on the river in April 1979 during the first phase of project formulation. Preliminary agency concerns were identified through coordination meetings and through agency comments on a preliminary proposed general permit (public notice circulated May 1979). Past and current agency responses to Individual Permit actions of a nature to be included under the proposed General Permit were also considered.

2.004 Many of the concerns voiced during the 1979 public meetings involved aspects of river management outside of the District's authority. Speakers repeatedly expressed dissatisfaction with the patrolling capability of the Coast Guard, the problem of pollution generated by river users in the form of litter and waste discharges directly into the river, and the effects of present and anticipated flood control releases from Bureau of Reclamation reservoirs. The repeated emphasis of these concerns points to an issue in



itself: the confusion brought about by the presence of numerous and overlapping authorities on the River. This confusion has promoted delays in the procurement of permits by property owners.

2.005 Delays in obtaining a permit was the primary concern pertinent to the District's jurisdiction which was expressed during the 1979 public meetings. Property owners complained of receiving confusing and contradictory instructions from the Los Angeles District office of the Corps when seeking information on the application procedure. These and other unexplained delays (e.g. lengthy processing time) constituted the main source of dissatisfaction; although disapproval was also expressed over the recently enacted District policy of placing applications for some individual boat docks in abeyance pending completion of the Environmental Impact Statement.

2.006 Agency concerns in response to the preliminary proposal for a general permit centered around the initially targeted permit areas. Although agencies acknowledged these areas to be heavily impacted by existing private structures, they pointed out that these areas also contain relatively undisturbed stretches which they did not consider appropriate for inclusion under a general permit. Some agencies were supportive of the general permit concept in the Bullhead City and Parker Strip areas, but felt that a general permit should incorporate provisions such as the following:

- a. Certain locations restricted to public-use facilities, and some areas closed to further development.
- b. Stipulations to exclude development in wetlands and areas of historic significance.
- c. A time frame limiting the amount of time in which the property owner must complete the applied-for structure.

Other agencies contended that these areas have already been impacted to the maximum extent acceptable and should be closed to further installation of private structures.

2.007 A second round of public meetings was held in November 1981, to solicit public response to the proposed General Permit and the DEIS in circulation at that time. Comments voiced at the hearings were generally in support of the General Permit. Some dissatisfaction was expressed over delays in the completion of the EIS and consequent prolongment of abeyant applications.

2.008 PLANNING OBJECTIVES. A complete discussion of project objectives is included in Section 3 of the Main Report under "Objectives of the Proposed Action." The major objectives of the action are: (a) to expedite the current permit process, and (b) to mitigate cumulative impacts of future District-permitted development.

### 3.0 ALTERNATIVES

3.001 GENERAL PERMIT ALTERNATIVE. The proposed General Permit is described in Section 5 of the Main Report; a draft version of the permit itself accompanies the EIS as Appendix A.

3.002 Under the General Permit alternative, five specific categories of structures (contiguous bulkhead walls, contiguous rip-rap slopes, sand beaches, individual and community boat docks) would be automatically authorized in designated areas along the lower Colorado River, provided all General Permit criteria are met by the permittee. The General Permit would encompass certain stretches of the river in the Bullhead City, Needles, Lake Havasu, and Parker Strip areas (maps showing the General Permit areas are included in Appendix A of the EIS).

3.003 The five categories of permitted structures incorporate dimensional and other requirements which must be met before authorization is granted. The General Permit also requires that the permittee notify the Commander at least 30 days prior to initiation of work.

3.004 Under the General Permit alternative, only those areas which have been determined capable of supporting maximum build-out without sustaining significant adverse impacts to public interest factors (including biological and cultural resources) would be designated for general authorization. Development impacts would be further mitigated through limitations and requirements incorporated into the General Permit. Structures would be limited dimensionally to protect navigational, recreational and safety interests; and the type, quality, and location of fill would be subject to conditions designed to protect water quality. The General Permit was designed to minimize adverse cumulative effects on the river environment through the exclusion of all areas characterized by high sensitivity ratings (e.g. wetlands and sensitive biological communities and significant cultural resources). Actions in these locations would necessitate an individual review.

3.005 The General Permit alternative would expedite processing of permits in the designated areas. By eliminating the need for a case-by-case evaluation including a site visit and a 30-day public notice period, normal processing time would be reduced from a current minimum of 90 days to immediate authorization following 30-day prior notification by the permittee. The General Permit would eliminate District travel expenditures for site visits to General Permit areas, and significantly reduce the number of staff-hours required for permit processing along the river.

3.006 WITHOUT CONDITIONS (NO-ACTION ALTERNATIVE). If the No-Action alternative is implemented, Individual Permits would continue to be processed and issued for most applied-for structures in the Study Area. Because the magnitude of most single-lot actions is relatively minor and cumulative impacts are difficult to address in the individual review process, predicted impacts of these actions are generally insignificant. Hence most single-lot improvements have been and would continue to be approved unconditionally or

with minor modifications. Permitting of these structures without consideration of cumulative impacts could potentially result in significant adverse impacts to water quality, recreation, navigation and public safety.

3.007 Under the No-Action alternative, no change would occur in the permit processing rate or procedures.

3.008 PERMIT MORATORIUM ALTERNATIVE. Under this alternative a moratorium would be placed on all further permit issuance for riparian improvements in the General Permit areas. The effect of this alternative would be to halt further private and public development below the ordinary high water mark. This would prevent site-specific as well as cumulative impacts to aquatic resources of the lower Colorado River. This alternative would restrict further private access to the river in the form of boat docks and launches; however, recreational use of the river would probably continue to increase as public access would still be obtainable through existing public launches and marinas. Increased use of the existing public access could result in navigational and safety hazards as the result of over-use and congestion.

3.009 An effect of this alternative may be that structures such as bulkheads, rip-rap slopes and beaches would be constructed outside the District's jurisdiction (i.e. landward of the ordinary high water mark) by property owners. These structures may result in significant adverse impacts to terrestrial and cultural resources.

3.010 The Permit Moratorium alternative would have a positive administrative impact on the District since time-consuming permit processing procedures would no longer be required.

3.011 COMPARATIVE IMPACTS OF ALTERNATIVES. Table 2 presents comparative impacts of the project alternatives.

Table 2. Comparative Impacts of Alternatives

<u>Resource Parameter</u>	<u>No Action Alternative</u>	<u>General Permit Alternative</u>	<u>Permit Moratorium Alternative</u>
Water Quality/ Aquatic Biology	Potential maximum build-out, potential adverse cumulative impacts to water quality.	Potential maximum build-out, limited adverse cumulative impacts.	Potential development above Corps jurisdiction; limited cumulative adverse impact.
Terrestrial Biology	No significant resources present; limited impact.	No significant terrestrial resources present; limited impact.	No significant resources present; limited impact from construction above ordinary high water mark.
Air Quality	Limited impact.	Limited impact.	Limited impact.
Cultural and Historical Resources	Significant resources protected or mitigated; no impact.	Significant resources excluded from general permit or protected through general permit conditions; no impact.	No control over building above ordinary high water mark; significant adverse cumulative impact.
Land Use	Individual Permits consistent with recreation-oriented population centers and public lands; no impact.	General Permit consistent with recreation-oriented population centers and public lands; no impact.	Conflicts with recreation-oriented land use on private and public lands; limited impact.
Population	No impact.	Limited impact.	Limited impact.
Recreation/Public Safety	Maximum build-out boat docks; potential cumulative adverse impact to public safety, recreation and navigation.	Maximum build-out, potential limited adverse impact (mitigation through permit conditions).	Potential for overuse of existing areas; significant localized adverse impacts.
Noise	Limited adverse impact.	Limited adverse impact.	No impact.

#### 4.0 AFFECTED ENVIRONMENT

4.001 INTRODUCTION. Riparian structures placed below the Ordinary High Water Mark may directly impact environmental parameters such as water quality to a varying distance downstream or upstream of the project site. In addition, the indirect impacts of a project are not necessarily confined to the immediate construction location. For these reasons, the discussion of affected environment has not been limited to the proposed General Permit areas, but includes the entire lower Colorado River within the jurisdiction of the Los Angeles District (Figure 7, Main Report). For the following discussion, the lower Colorado River has been divided into two segments, as shown in Figure 7 (Main Report). Segment 2 (Davis Dam and south) is further subdivided for certain discussions into three subareas, also delineated in Figure 7 (Main Report).

4.002 It is recognized that the major areas of impact are the General Permit Areas delineated on the maps accompanying the proposed General Permit in Appendix A. Hence discussion of the affected environment emphasizes these areas. A more detailed account of the resources and resource parameters of the affected environment is included in Section 7 of the Main Report under "Environmental Setting."

##### WATER QUALITY

4.003 Water quality, variable over the lower Colorado, is influenced greatly by the presence of numerous reservoirs. Glen Canyon Dam, at the upper end of the affected environment, significantly affects water quality downstream. Other impoundments along the river occur above Hoover Dam near Las Vegas (Lake Mead), Davis Dam at Bullhead City (Lake Mohave), Parker Dam approximately 10 miles above Parker (Lake Havasu), Headgate Rock Dam at Parker Dam (Lake Moovalya), Imperial Dam between Blythe and Yuma (Imperial Reservoir), and Laguna Dam above Yuma (Mittry Lake). Additional smaller diversion structures occur, such as the Palo Verde Diversion Dam above Blythe.

4.004 Temperature regimes vary considerably as the result of warm or cold water releases from dams (an effect of the presence and stability of the water temperature stratification of the impoundment). The waters of dams which discharge from near the surface of the reservoir are much warmer than those of dams that discharge from near the bottom of impoundment. Suspended materials settle out in the impoundments above the dams due to decreased velocity flows; thus, the discharge from the dams are generally reduced in suspended solids. Suspended materials increase as flows proceed downstream from the dam as a result of erosion, runoff and input from tributaries.

4.005 Water quality parameters for the lower Colorado River (segments 1-2) are recorded in Table 1 of the Main Report.

##### AQUATIC BIOLOGY

4.006 FISH POPULATIONS. Table 2 in the Main Report presents a list of species of fish collected or observed in each segment of the affected environment. More detailed information on the distribution of fish populations is found in Section 7 of the Main Report.

#### Segment 1: Lee's Ferry to Davis Dam

4.007 Between Lee's Ferry and Davis Dam greater numbers of species and individuals are found in reaches of the River with rocky substrates than in those with sandy bottoms. Cold water from Glen Canyon Dam has decreased water temperatures in Grand and Marble Canyons such that spawning temperatures required by native species of fish seldom occur.

#### Segment 2: Davis Dam to the Mexican Border

4.008 Below Davis Dam the fishery varies with habitat, and is influenced by water temperatures in the reservoirs and releases from numerous dams. Immediately below Davis Dam the fish species diversity is quite low, probably due in part to fluctuating water levels. The recreational fishing for striped bass (*Morone saxatilis*) below the dam is significant, particularly during spawning runs. The littoral zone has been significantly altered by dredging, eliminating riffles and holes, increasing bank erosion and siltation and decreasing suitable spawning and larval/juvenile rearing areas.

4.009 Banklines along the river range from deeper areas providing shelter for a good fish population to shallow muddy areas of little value to the fishery. The southernmost reach of the study area supported more species of fish than any other river segment.

4.010 AQUATIC VEGETATION. More detailed information on aquatic vegetation is given in Section 7 of the Main Report. The following is summarized from that information.

#### Segment 1: Lee's Ferry to Davis Dam

4.011 Based on numbers of phytoplankton organisms, the upper reaches of the Colorado (above Davis Dam) are relatively unproductive. The phytoplankton population is diverse but sparse and decreases with distance downstream. Vegetation in this upper reach consists mainly of algae covering rock and gravel substrates.

#### Segment 2: Davis Dam to the Mexican Border

4.012 Below Davis Dam emergent vegetation consists predominantly of cattail (*Typha latifolia*) tules (*Scirpus* sp.) sedges (*Carex* sp.) and giant African reed (*Phragmites communis*). Emergent aquatic vegetation is rare in areas of stony bottoms or shifting sand, conditions which preclude the rooting of vegetation. Major submergent vegetation is sago pondweed (*Potamogeton pectinatus*), chara (*Chara* sp.), and small beds of coontail (*Ceratophyllum demersum*) and spiny naiad (*Najas flexilis*). Microscopic algae present is *Cladophora* (especially in shallow water with hard substrates and high insolation), *Epithemia*, films of diatoms and some mats of blue-green algae.

4.013 INFAUNA. More detailed information on infauna is given in Section 7 of the Main Report. The following is summarized from that information.

#### Segment 1: Lee's Ferry to Davis Dam

4.014 Segment 1 is characterized by relatively low productivity in terms of benthic invertebrate infauna. Edges of the mainstream and backwaters support a more diverse infauna than the center of the channel. The organisms in this reach consist mainly of combinations of the amphipod Gammarus lacustris, chironomid larvae, ostracods, oligochaetes and snails. In the lower portions of this segment (between Hoover and Davis Dams) productivity is higher. Infauna consists mainly of oligochaete worms and amphipods. Benthic invertebrates in this reach are found mainly in shallow rubble areas and areas with silt and detritus on the bottom. Amphipods are associated with microscopic algae and submergent vegetation.

#### Segment 2: Davis Dam to the Mexican Border

4.015 Below Davis Dam, diversity of benthic fauna varies widely in response to channel substrate and other factors. High diversities result from hard substrates that provide good anchoring and coverage for invertebrates. Diversity is also high in areas where cool discharges from dams contain high concentrations of particulate matter.

4.016 Where silt-sand bottoms occur, the number of organisms decreases and dominance shifts to oligochaete worms and chironomid dipteran larvae. Substrates of shifting sand are devoid of organisms. Backwaters contain oligochaetes, chironomids and Asiatic clams.

#### TERRESTRIAL AND WETLAND BIOLOGY

4.017 The Colorado River from Lee's Ferry to the Mexican border contains diverse and valuable terrestrial and wetland biological resources. The presence of these resources is remarkable when it is considered that a majority of the lower Colorado has been heavily disturbed by construction of dams, channelization, dredging and other man-caused and natural disturbances. The following discussion relates major characteristics of plant communities and wildlife populations found along the lower Colorado River.

4.018 VEGETATION. Complete species lists for vegetation along the lower Colorado River is given in Appendix B-1 and summarized as follows:

#### Segment 1: Lee's Ferry to Davis Dam

4.019 Vegetation above Davis Dam is characterized by riparian and marsh communities above Lake Mead, and desert scrub along the land/water interface of Lakes Mead and Mohave. The riparian community is represented by salt cedar (Tamarix chinensis), arrowweed (Pluchea sericea), and seep willow (Baccharis glutinosa). Marshlands are predominantly cattail (Typha latifolia) and horsetail (Equisetum spp.). In many areas above Lake Mead, a cliff or rock interface occurs, essentially devoid of vegetation. The desert scrub community in the reach above Davis Dam is dominated by creosote bush (Larrea tridentata), burrobrush (Ambrosia dumosa), brittlebush (Encelia farinosa), cheeseweed (Hymenoclea salsola) and sweetbush (Bebbia juncea).

## Segment 2: Davis Dam to the Mexican Border

4.020 From Davis Dam south vegetation can be categorized into four general communities as discussed below.

4.021 Riparian Woodlands. The following associations occur within this community:

a. Cottonwood/Willow Habitat--This habitat is the least common of the riparian associations and consists primarily of cottonwood (Populus fremontii) and willow (Salix goodingii). This community is rather dense with at least 20 percent of the total vegetation consisting of trees.

b. Honey Mesquite Habitat--Many areas in this association contain almost pure stands of honey mesquite (Prosopis velutina). However, in some areas introduced salt cedar has invaded this association in significant numbers to form a honey mesquite/salt cedar mix association.

c. Screwbean Mesquite Habitat--Few, if any, pure stands of screwbean mesquite (Prosopis pubescens) exist within the study area. However, a salt cedar/screwbean mesquite mix community occurs throughout Segment 2.

d. Salt Cedar Habitat--Many areas have been invaded by salt cedar or tamarix. This Eurasian introduced species out-competes most native riparian species and has substantially contributed to the decline of native species within the area. This species has been instrumental in changing the character of much of the riparian areas along the river.

e. Arrowweed Habitat--Areas containing dense stands of arrowweed (Pluchea sericea) occur in scattered portions throughout the study area.

4.022 Desert Scrub. Along some portions of river (e.g. Lake Havasu, Topock Gorge) riparian vegetation is not well developed and desert scrub is distributed almost to the waters edge. Vegetation within these areas varies between creosote scrub with creosote bush and burrobush dominant to wash vegetation containing palo verde (Cercidium floridum), cat claw (Acacia greggii) and smoke tree (Dalea spinosa). Some rocky areas are essentially devoid of vegetation.

4.023 Developed Areas. Significant portions of the affected environment contain areas disturbed by agricultural development or by recreational development. Most native vegetation within these areas has been removed, although locally some vestiges of riparian vegetation remain (i.e. cottonwood and mesquite). Some areas developed into agriculture (e.g. Colorado River Indian Reservation) have a buffer strip of riparian vegetation between agricultural fields and the river.

4.024 Marshes. Marshes are distributed throughout this stretch of the river. Based on field observations, these marshes generally are of two types: in-channel marshes and marshes adjacent to the river but out of the main channel. In-channel marshes generally occur in areas where currents have produced a high degree of siltation. These marshes contain sedges, tules, and



cattails. South of Blythe, giant African reed (Phragmites gigantea) becomes a dominant emergent. Distributed primarily on the western bank of the river, these marshes are generally less than 20 acres in size and may appear or disappear rather quickly depending upon currents and siltation rates. Other marshes located off the main channel are generally more extensive and permanent containing dense tules, cattails and sedges. Major marshes in this segment include Topock Marsh, the upper end of Lake Havasu; and Imperial National Wildlife Refuge.

4.025 WILDLIFE. Aspects of avian, mammalian, and reptilian wildlife are detailed in Section 7 of the Main Report and summarized below.

4.26 Avian Species. A complete list of avian species expected to occur along the lower Colorado River is given in Appendix B-3.

#### Segment 1: Lee's Ferry to Davis Dam

4.027 Above Davis Dam species diversity is extremely high. Above Lake Mead this is attributable to the presence of aquatic and riparian habitats. The richest habitats for wildlife in this reach occur at the confluences of tributary streams and the Colorado. Between Hoover and Davis Dam, the presence of large surface water areas account for high diversities. Populations of migratory waterfowl are abundant.

#### Segment 2: Davis Dam to the Mexican Border

4.028 This portion of the lower Colorado represents a significant habitat area for terrestrial and shore birds. White-winged dove (Zenaidura asiatica), mourning dove (Zenaidura macroura), Gambell's quail (Ophorpyx gambelli), and a large number of migratory waterfowl comprise a significant resource of the area. Several species occurring within this portion of the river are considered sensitive. The Yuma clapper rail (Rallus longirostris yumanensis) listed as endangered by the USFWS and as threatened and unique by Arizona Game and Fish department (Group 3), nests and feeds primarily in marshes containing dense vegetation including cattails or tules. The entire river south of Davis Dam should be considered as a migratory corridor for the species. The Black rail (Laterallus jamaicensis), a species listed as rare by the State of California and as threatened by the Arizona Game and Fish Department (Group 2) occurs in major populations at certain locations in the southern reach of the study area. The yellow-billed cuckoo (Coccyzus americanus), listed as rare by the state of California, frequents riparian areas along the entire river. It is not known whether the subspecies of Bell's vireo (Vireo bellii) occurring along the lower Colorado River is the endangered Least Bell's vireo or the Arizona Bell's vireo (no endangered status).

4.029 Mammals. A complete list of mammalian species expected to occur along the lower Colorado River is given in Appendix B-2.

#### Segment 1: Lee's Ferry to Davis Dam

4.030 Mammalian populations in riparian communities of Segment 1, primarily above Lake Mead, are dominated by the canyon mouse (Peromyscus crinitus). Opportunistic scavengers such as ringtail (Bassariscus astutus) and spotted

skunk (Spilogale gracilis) tend to occur in high concentrations near established campsites. Mule deer (Odocoileus hemionus) and desert bighorn sheep (Ovis canadensis) occur throughout the area and utilize shoreline areas for foraging and watering sites.

4.031 Species composition in the Desert scrub areas of Segment 1 (Lakes Mead and Mohave) is typical of the Mohave Desert and southern Nevada and northern Arizona. These areas are characterized by moderate species diversity and high productivity. The primary sensitive species, desert bighorn occur throughout this stretch of Colorado River influence.

#### Segment 2: Davis Dam to the Mexican Border

4.032 South of Davis Dam, cactus mice (Peromyscus eremicus) are the most abundant species within riparian areas. Cottontails (Sylvillagus audubonii) are particularly abundant in riparian areas bordered by agricultural areas. Other larger mammalian species within the area include coyote (Canis latrans), spotted skunk (Spilogale gracilis) and striped skunk (Mephitis mephitis) and grey fox (Urocyon cinereoargenteus). Mountain lions (Felis concolor) and bobcats (Lynx rufus) may occur in less developed areas. Larger game species within the area are limited to the mule deer, which occurs in significant numbers throughout the area with high numbers in the riparian habitats.

4.033 Desert bighorn sheep is a Bureau of Land Management designated sensitive species that generally ranges throughout much of the study area. Habitat areas include the Chemehuevi Mountains, Big Maria Mountains, and throughout most of the areas south of Blythe. Bighorn range generally within the mountainous areas of both California and Arizona. The sheep use the Colorado River primarily as a watering spot.

4.034 Reptiles and Amphibians. A complete list of reptiles and amphibians expected to occur along the lower Colorado River is given in Appendix B-4.

#### Segment 1: Lee's Ferry to Davis Dam

4.035 Reptiles and amphibians of the riparian areas in Segment 1 of the affected area (generally located above Lake Mead) are dominated by the side-blotched lizard (Uta stansburiana), tree lizard (Urosaurus ornatus), and the desert spiny lizard (Sceloporus magister). In the desert scrub areas of this segment (shoreline of Lakes Mohave and Mead) species composition is typical of the Mojave Desert. One species of amphibian (Rana onca) and two species of reptiles, the desert tortoise (Gopherus agassizi) and the Gila monster (Heloderma suspectum), are state listed sensitive species in Nevada; however, the Gila monster is also a state of Arizona sensitive species.

#### Segment 2: Davis Dam to the Mexican Border

4.036 South of Davis Dam reptiles generally occur at lesser densities within riparian and marsh habitats than within desert scrub upland habitats. Long-tailed brush lizards (Urosaurus gracilis) and to a lesser extent, desert spiny lizards are arboreal and use the riparian habitat to a greater extent than other species. The coachwhip (Masticophis flagellum) and the western

diamondback (Crotalus atrox) are the most abundant snakes along the river. The introduced bullfrog (Rana catesbiana) occurs at high densities within the river and associated backwaters. Woodhouse toad (Bufo woodhousei) occurs at high densities in agricultural areas and the Western spadefoot (Scaphiopus couchi) is abundant in desert scrub.

#### AIR QUALITY

4.037 METEOROLOGY/CLIMATOLOGY. The climate of the affected area is characterized by considerable homogeneity throughout the lower river elevations, commencing from approximately Hoover Dam to the Mexican border. These arid regions of the river experience the hottest and driest weather throughout the contiguous United States. The semiarid upper regions, because of the sharp terrain relief and higher elevation, have an extremely varied and considerably more comfortable summer climate with correspondingly colder winters. The region below Hoover Dam is considered a tropical and subtropical desert climate while the higher elevations are considered a mid-latitude steppe-type climate.

4.038 Temperature along the river generally decreases about 3.5°F for every 1,000 feet of elevation increase. Mean temperatures at Yuma are 72°F, while at the Grand Canyon, the annual mean drops to 49°F.

4.039 Precipitation is very light throughout the study area and is characterized by two distinct seasonal maxima. Infrequent summer thunderstorms result from moisture influx from Mexican waters. During the winter, light rains fall from weak storms that have lost most of their moisture in crossing the coastal ranges and the Sierra Nevada.

4.040 Winds along the river generally have moderate speeds favorable for good pollutant dispersion without creating dangerous wind situations. Prevailing winds along the river follow the river topography, originating predominantly from the south in summer and from the north in winter.

4.041 Atmospheric stability is also well structured for good daytime ventilation. Surface-based radiation inversions form on cool, calm nights that restrict dispersion, but these dissipate soon after sunrise.

4.042 AMBIENT AIR QUALITY. Except for two major point sources, the Navajo Power Plant near Page, Arizona and the Mohave Power Plant near Bullhead City, Arizona, ambient air quality along the river is generally very healthful and in conformance with the Environmental Protection Agency's attainment standards.

4.043 The affected area experiences no violations of gaseous emissions; however, total suspended particulates (TSP) levels are of major concern in the dry desert climate. Localized sources of fugitive dust resulting from the lack of soil and atmospheric moisture are prevalent in areas of agricultural activity and off-road or unimproved roadway vehicle use.

4.044 The distribution of ambient particulate levels indicates a gradual increase in dust levels as the river flows south to more urbanized and arid locations. Areas such as Bullhead City, Topock, Needles, Parker, and Yuma are

frequently in excess of the applicable standards for TSP levels. This deterioration results primarily from the decrease in rainfall as the river progresses south and the increase in soil disturbance from agricultural operations along the California-Arizona border. Yuma reportedly has the highest concentrations of TSP of any point along the river. (See Table 5, Main Report.)

#### **CULTURAL AND HISTORICAL RESOURCES**

**4.045 HISTORICAL RESOURCES.** A complete inventory of historical resources along the lower Colorado River is contained in the Preliminary Environmental Resources Inventory Report, Vols. I and II (1981).

##### **Segment 1: Lee's Ferry to Davis Dam**

**4.046** The area above Davis Dam contains 22 identified historic resources. All but one of these date to historic period occupation. These are predominantly river crossings, ferries and bridges. Two of these properties, Hoover Dam and Grand Wash Archeological District, are listed on the National Register of Historic Places, and five others are eligible for inclusion.

##### **Segment 2: Davis Dam to the Mexican Border**

**4.047** The area below Davis Dam contains 109 identified historic resources 9 of which are listed on the National Register of Historic Places. Of these, 72 are of the historic period, and 37 are archeological sites. Historic sites center on early settlement and river crossings. Of the 72 historic period sites, 24 appear to be eligible for inclusion in the National Register of Historic Places. Archeological sites consist primarily of trails, campsites, petroglyphs, and intaglios. All of the archeological sites are considered to be potentially eligible for inclusion in the National Register of Historic Places.

**4.048 CULTURAL RESOURCES.** Current Native American use of the Colorado River includes individual recreation, commercial recreation, irrigation and plant procurement. In terms of both dollar amount and intensity of effort, irrigation of agricultural fields is of primary importance.

**4.049** Interviews with tribal officials, local residents and individual Native Americans provided the following information regarding natural resource and plant use:

a. Native American basket makers still procure native plant fibers from riverine and wetland areas. These areas have been severely depleted by damming, agricultural land use, and extensive land clearing for a variety of land uses. Significant plant fibers include rushes (Juncus acutus var. sphaerocarpus) and Muhlenbergia ringens.

b. The Cocopah, and assumedly other tribal groups, still cremate certain deceased members. Traditional cremation requires large pyres of mesquite wood, an increasingly depleted wood source. The Cocopah at Somerton are

forced to buy, or at least procure, their mesquite from neighboring Quechans at Fort Yuma. Continued loss of mesquite groves was perceived as a real problem by every tribal group contacted.

c. Clay sources, pigments within natural soils, and wildlife both within the river and along its shores were noted as used on an individual basis. Decreased access to such resources and continued depletion of them is seen as a serious consideration.

#### LAND USE

##### Segment 1: Lee's Ferry to Davis Dam

4.050 The entire stretch of riverfront land in this segment is contained within the Grand Canyon National Park and the Lake Mead National Recreation Area with the exception of small stretches of Indian Reservation and tribal lands. Land use in the Park and Recreation Area is oriented toward providing appropriate recreational opportunities.

##### Segment 2: Davis Dam to the Mexican Border

###### Davis Dam to Parker Dam

4.051 This portion of the river encompasses three urban centers: Bullhead City, Lake Havasu City, and Needles. Two Indian reservations are situated here also: the Fort Mohave and the Chemehuevi Valley Indian Reservations.

4.052 Bullhead City (including the Riviera-Big Bend area), Lake Havasu City, and Needles provide the highest concentration of urban use in proximity to the river along this segment. Residential uses prevail along the river in Bullhead City and the Riviera-Big Bend area. Needles also contains some private residential developments along the river. Most of the residential developments with waterfront locations contain boat docks. Unique to any of the urban areas studied, Bullhead City features casinos on the Nevada side of the border. Several of these facilities are situated on the waterfront. Access to the casinos is readily available by ferry from the Arizona side of the river.

4.053 Besides the residential uses along the river common to these cities, Lake Havasu City and Needles contain public recreation areas adjacent to the river. The Needles city facilities include marinas, campgrounds, and golf courses. The waterfront in the Lake Havasu area contains general camping facilities with marinas and boat docks, as well as day facilities, a golf course, and local airport.

4.054 Land use on the Indian reservations is primarily devoted to agriculture. However the Chemehuevi Indian Reservation contains a residential development with waterfront improvements (including recreational facilities) at Havasu Landing.

#### **Parker Dam to Blythe**

4.055 The town of Parker in Arizona represents the only incorporated municipality in the area whose corporate boundaries extend to the river. The Colorado River Indian Reservation represents the largest single political entity between Parker Dam and Blythe.

4.056 Between Parker Dam and the northern boundaries of the reservation is a stretch of river commonly referred to as the "Parker Strip." This narrow band of river area incorporates, in part, BLM lands in portions of Yuma and San Bernardino Counties. Each side of the river is densely packed with an assortment of residences (primarily mobile homes), campgrounds, recreational vehicle facilities, and associated commercial enterprises as this stretch of river is heavily utilized for recreational boating and waterskiing.

4.057 Agricultural land use dominates the area as defined by the CRIT Reservation and general Parker Valley areas. The balance of the area stretching south to Ehrenberg (Arizona) and Blythe (California) is comprised of natural open space areas.

#### **Blythe to the Mexican Border**

4.058 The cities of Blythe and Yuma are the major urban centers in this area. Blythe is separated from the river by unincorporated lands and hence it maintains no public or private facilities on the river. Isolated residential communities are situated in Ehrenberg in Yuma County, and on an isolated stretch of Riverside County land between the Mayflower County Park and northern limits of Blythe. These two areas are primarily trailer park sites. Riverside County maintains a series of parks and marinas on the river on either side of Interstate 10. Riverside County land areas immediately adjacent to the river near Imperial County are restricted to open space and recreational use. Inland land use is predominantly agricultural.

4.059 Land use for the entire length of Imperial and the remainder of Yuma County adjoining the river is generally natural open space as the majority of the river is contained within the Gila and Imperial National Wildlife Refuges and the Mitty Lake Refuge. A few recreational parks and campgrounds are interspersed in these areas such as Picacho State Recreation Area. Natural open space areas continue to dominate the riverbank landscape south of to the city of Yuma. However, agricultural use is evident in some areas adjacent to the river.

4.060 The last segment of the river above the Mexican border is owned primarily by the city of Yuma and the Yuma Indian Reservation. This stretch of river area exhibits open space and wildlife habitat uses. Recreational use is generally restricted to fishing due to the shallowness of the river.

#### **POPULATION**

##### **Segment 1: Lee's Ferry to Davis Dam**

4.061 The segment between Lee's Ferry and Davis Dam is primarily occupied by publicly owned and used land except for small Native American populations. There are no permanent population centers in this area.

## Segment 2: Davis Dam to the Mexican Border

### Davis Dam to Parker Dam

4.062 The three major population centers along this portion of the river are Bullhead City/Laughlin, Lake Havasu City, and Needles. Also located here are the Fort Mohave and Chemehuevi Valley Indian Reservations, both of which are relatively sparse in terms of population.

4.063 Bullhead City (Arizona) is a rapidly growing residential and commercial community. Within the past ten years, population levels have increased by 168 percent. The projected rate of growth from the city over the next 20 years indicates a slowing trend.

4.064 The Lake Havasu City area, a planned residential community in Arizona, has been the fastest growing region along the river within the last ten years, experiencing a population increase of approximately 224 percent from 4,861 to 15,737.

4.065 The City of Needles (California) serves as the major point of entry into the California-Mohave Desert. Population growth in the city has been slow, increasing from 4,051 to 4,120 between 1970 and 1980.

4.066 South of Lake Havasu City to Parker Dam, existing urbanization is limited to trailer parks and marinas.

### Parker Dam to Blythe

4.067 There are two population centers along this portion of the river: Parker and Blythe. There are several interrelated but separate communities in the vicinity of Parker that form what is known as the "Parker Strip." The Parker Strip is one of the most heavily used sections of the river by recreationists; permanent population figures are projected to increase at a rate of 1.1 percent over the next decade. In addition, nearly 50 percent of the Native American population along the lower Colorado River is located at the Colorado River Indian Reservation which surrounds the Parker area.

### Blythe to the Mexican Border

4.068 This portion of the river is characterized by its lack of development and the presence of two wildlife refuges and several county parks. The single population center of significance is the city of Yuma. Yuma's population has increased by over 46 percent between 1970 and 1980; projections indicate that the growth rate will slow to 14 percent during the next ten years. Also located in the Yuma area are the Quechan and Cocopah Indian tribes.

## RECREATION/PUBLIC SAFETY

### Segment 1: Lee's Ferry to Davis Dam

4.069 This segment of the Colorado River is comprised of areas within the Grand Canyon National Park and Lake Mead National Recreation Area (NRA).

River use between Lee's Ferry and Pierce Ferry is primarily comprised of whitewater rafting. Below Pierce Ferry and in Lake Mead NRA both motorized and non-motorized boating occurs. The National Park Service (NPS) and Arizona Game and Fish Department (AGFD) patrol Lake Mead, Mohave and the Grand Canyon within the Park. Previously, the U.S. Coast Guard controlled buoy and reef markers in Lakes Mead and Mohave but has since rescinded all duties in the Colorado River.

#### Segment 2: Davis Dam to the Mexican Border

##### Davis Dam to Parker Dam

4.070 This segment includes many of the narrower parts of the Colorado River, where recreational uses are generally less intense, and it includes three primary areas of urban development: the Bullhead City area, Needles, and Lake Havasu City. Lake Havasu is the only large body of water within this segment. Water-related recreational activities include swimming, water skiing, fishing, and canoeing. Numerous campgrounds are located on the Arizona side. There are continual conflicts between fishermen and skiers, and residents have complained of the noise from motorboats.

4.071 One hazardous area of the river within this segment is the vicinity immediately above and below the Bullhead City/Laughlin area. This is due to at least four factors: (1) a large number of boat docks and boats; (2) the narrowness of the river; (3) the curve in the river at River Bend; and (4) use of the river by many different user types (i.e. fishermen, water skiers, rafters, canoeists, etc.). In addition, the ferries that shuttle people between Bullhead City and the gambling establishments across the river in Laughlin, Nevada, create cross-traffic at Bullhead City. The swift current prohibits a direct cross-stream course.

4.072 Public safety is also a major issue at Lake Havasu, Arizona Game and Fish Department boating records for total accidents, accidents with injuries, and accidents with fatalities rank Lake Havasu as either 1, 2, or 3 for all years since 1974.

##### Parker Dam to Blythe

4.073 The northern quarter of this river section, the Parker Strip, is much more highly developed with recreation facilities than the remaining three-quarters. Fifteen-mile-long Lake Moovalya (impounded at Headgate Rock Dam just above Parker) is 400 feet at its widest part and has historically attracted heavy use by skiers and motorboaters. Private and public resorts, residences, and parks abound on the eastern side of the river. The Parker Strip probably has the highest density of boat docks on the entire Colorado River. The concentration of a large number of people in motor boats in such a narrow part of the river, which has numerous curves, has led to serious safety and noise problems.



#### **Blythe to the Mexican Border**

4.074 This section of the river is far less developed than any of the portions previously discussed. In addition to National Wildlife Refuges, State Recreation Areas, and county parks, this section has numerous private recreation resorts and campgrounds concentrated in the Blythe/Ehrenberg area.

4.075 The river channel in this segment south of Palo Verde is flanked by numerous backwater and sidestream areas which are used for power boating, fishing, and skiing. The speed at which the motorized crafts dart in and out of the backwater areas causes safety hazards to other recreational users and the careless operation of power boats has induced numerous collisions both in the backwaters and at their intersections with the main river channel.

4.076 Additional hazards are presented by conspicuous fluctuations of the water level which can expose sandbars and snags one day, and completely submerge them the next. Also, a section of the main river channel in the Imperial National Wildlife Refuge is closed to skiing which eliminates that area for this use and indirectly increases the density of water skiers in other areas to the south.

#### **NOISE**

##### **Segment 1: Lee's Ferry to Davis Dam**

4.077 Motorized boating in the Grand Canyon National Park has been restricted to certain annual periods due to the perceived disruption of wilderness experience by other river users. The Lake Mead and Lake Mohave portions of the river have designated areas where motorized boating is allowed, and complaints regarding noise are uncommon.

##### **Segment 2: Davis Dam to the Mexican Border**

##### **Davis Dam to Parker Dam**

4.078 Certain intensive recreational or boating areas are identified as noise sensitive due to extensive urban or residential development along the shoreline. Existing noise levels at these locations are frequently in violation of the acceptable outdoor noise sensitivity level of 65 dB for residential uses, as established by the U.S. Department of Housing and Urban Development. The following areas within this segment would be applicable: Bullhead City (RM 272-273), Riviera (RM 269-270), Needles (RM 245-247), Havasu Palms (RM 204), and Havasu Springs (RM 190).

4.079 The Lake Havasu area is not particularly noise sensitive due to the primarily water-oriented recreational nature of the lake shore. Motorized boating tends to occur far enough away from shore at a distance sufficient to attenuate noise to an acceptable degree to receptors on shore.

4.080 The Topock Marsh and Lake Havasu Wildlife Refuges are considered sensitive receptors.

**Parker Dam to Blythe**

**4.081** The area known as the "Parker Strip" (RM 175-192) is the most densely utilized segment of the river, and consequently experiences high degrees of noise levels.

**Blythe to the Mexican Border**

**4.082** The riverfront residential development areas adjacent to Blythe and Ehrenberg experience high degrees of noise level due to the high intensity of boating activity in these areas. Areas highly sensitive to increased noise levels are the passive recreation and wildlife habitat portions of the river, primarily Cibola National Wildlife Refuge (RM 57-69), Mittry Lake RM 43-49), and the segments from the Laguna Dam to Yuma (RM 26-92).

## 5.0 ENVIRONMENTAL EFFECTS

### WATER QUALITY AND AQUATIC BIOLOGY

5.001 GENERAL PERMIT ALTERNATIVE. The General Permit alternative would allow ultimate expansion of individual structures (i.e. those authorized under the General Permit) to the maximum build-out situation. Areas most likely to attain high-density development are Bullhead City, Needles, and Parker.

5.002 Those General Permit-authorized structures most likely to undergo proliferation are individual boat docks. The effects of maximum densities of individual docks (one dock per 50 feet) on the aquatic environment in these locations would not be significant. Shading would occur, potentially lowering productivity; and minor amounts of benthic habitat would be disturbed through placement of pilings. Because a strong correlation does not exist between boat dock density and boat traffic on the river (due to availability of public access), the increased potential for oil spills and grease deposition is not major. Beneficial impacts of cumulative dock construction include near-shore flow alteration, shading, and areas of refuge for juvenile fishes.

5.003 Because extensive bulkhead and riprap development has already occurred in the areas designated for a General Permit, construction of these types of stabilization is expected to occur in a manner such that gaps in existing alignments are filled. Authorization is only granted to those structures that are constructed contiguous with an existing bulkhead/riprap alignment. This would serve to maintain uniform flow characteristics, thereby preventing bank erosion and the washing-out of existing isolated assignments with resultant downstream siltation. If extensive bulkhead development were to encroach into a previously unaltered stretch of shoreline, it would result in higher near-shore velocities with increased scouring and sediment transport. A minor increase in flooding and minor changes in flooding locations could occur as a result. Fish species associated with the zero-flow zone would be displaced to other slow-moving areas.

5.004 Extensive riprap slopes would not affect fish habitat to the same degree as this form of revetment does not eliminate the zero-flow zone. However, short-term impacts of cumulative development to flow characteristics would occur, effecting an alteration in stream-bed configurations.

5.005 Because of the small scale nature of the types of projects authorized under the General Permit, and because General Permit areas were selected on the basis of low biological sensitivities, no significant impact to rare, threatened, or endangered aquatic species is anticipated.

5.006 NO-ACTION ALTERNATIVE. Under the No-Action alternative, the study area would potentially attain maximum build-out of boat docks and bulkhead/riprap alignments. Extensive intermittent bulkhead or riprap development would disrupt flow with resultant changes in bottom configuration due to scouring and sediment transport. Increased scour could cause erosion of neighboring bulkhead walls, or deposition interfering with navigability. High levels of turbidity would also be generated.

5.007 PERMIT MORATORIUM ALTERNATIVE. A moratorium on permits is expected to lead to more development above the jurisdiction of the District. Overall development and use of the river would not decrease; therefore, the environmental effect generated by the development would not be reduced. It is possible that if bulkheads and rip-rap slopes are completed in areas outside of the District's jurisdiction, these downstream impacts would still be significant, and their construction could not be controlled.

#### **TERRESTRIAL AND WETLAND BIOLOGY**

5.008 GENERAL PERMIT ALTERNATIVE. Under the General Permit alternative little impact on terrestrial vegetation is expected in that previous disturbances have occurred throughout most of these areas. Construction of bulkhead and rip-rap alignments would potentially result in removal of a limited amount of vegetation near the shoreline, including remnants of tulefat, or willow. The cumulative loss of these plants is not considered significant because of the small numbers and extent of the community.

5.009 Construction of docks, bulkheads, and rip-rap slopes would create short-term construction-related effects upon the more urban-adapted species of wildlife within the area. Long-term effects would be minimal, since the designated areas are already urbanized.

5.010 The General Permit alternative provides measures for protection of wetland and other sensitive biological resources. No significant impact to rare, threatened, or endangered species as a result of implementing this alternative has been identified.

5.011 NO-ACTION ALTERNATIVE. Individual permitting would have the same effect on terrestrial resources as construction under a General Permit. Remnant shoreline vegetation representing sensitive communities would be removed to facilitate bulkhead and rip-rap development; however, cumulative losses of this type would not be significant for these areas.

5.012 PERMIT MORATORIUM ALTERNATIVE. Under the Permit Moratorium alternative, if construction were to occur outside of the District's jurisdiction, it would not have significant adverse impacts in that most of these areas have undergone previous disturbances from development, or do not contain sensitive terrestrial resources.

#### **AIR QUALITY**

5.013 GENERAL PERMIT ALTERNATIVE. The relationship between General Permit-authorized facilities and air-emissions generation is largely indirect, in that recreational facilities in some part induce emission-generating activities. However, an absolute correlation between, for example, boat docks and increased boat usage has not been demonstrated. To the extent that usage is not solely a function of private moorage, the General Permit alternative would have no long-term impacts on air quality.

5.014 NO-ACTION ALTERNATIVE. Air quality impacts under the No-Action alternative would be the same as for the General Permit alternative.

5.015 PERMIT MORATORIUM ALTERNATIVE. A restriction on the expansion of existing recreational facilities would not necessarily reduce recreational use of the river. Existing public access would undergo intensified usage to accommodate increased demands. Therefore, impacts on air quality resulting from boat usage would continue to occur. The impact to air quality under this alternative would be the same as for the above alternatives.

#### CULTURAL AND HISTORIC RESOURCES

5.016 HISTORIC RESOURCES. Impacts to historic resources under the proposed General Permit and two alternatives are discussed below.

5.017 General Permit Alternative. Since the General Permit does not apply to any project for which the affected area includes a National Register or potentially eligible property, no impacts to significant historical or archeological resources would occur. All General Permit areas have been surveyed for the presence of historic resources. All National Register and potentially eligible properties have been plotted on large-scale maps to be used by the District. These maps will be updated annually. For any project falling within one mile of a National Register or potentially eligible property, proposed plans will be examined by a District archeologist to determine whether the cultural resource falls within the affected area of the proposed project. If such a determination is made, an individual review will be required.

5.018 In addition to the above stated actions, the General Permit will include condition that items of potential historical, archeological, or scientific significance which are discovered in the course of construction shall be carefully preserved in situ pending a determination by the District of their significance and appropriate disposition.

5.019 No-Action Alternative. Under the no-action alternative, each proposed project would require an Individual Permit. In this case, each project would come under existing District review (33CFR325, Appendix C) for impacts to historical resources. Each project would be subject to mitigation and/or modification as appropriate and thus would involve no additional impact to significant historical resources.

5.020 Permit Moratorium Alternative. Denial of future permit applications in the study area could lead to increased impacts to significant historical resources. A moratorium could act to encourage property owners to build their structures outside of the District's jurisdiction. Building above the Ordinary High Water Mark would be likely to cause increased impacts to historical resources, as more sites are located above this mark than below. Because such projects would be outside of the District's jurisdiction, they would not, in many cases, come under any form of environmental review. Therefore, implementation of this alternative would potentially cause increased impacts to significant cultural resources.

5.021 CULTURAL RESOURCES. Impacts to cultural resources under the proposed General Permit and two alternatives are discussed below.

**5.022 General Permit Alternative.** The traditional Native American collection areas so far identified are not located within the proposed General Permit areas. Therefore, issuance of the General Permit would not increase impacts to these resources.

**5.023 No-Action Alternative.** Impacts under this alternative would be the same as under the General Permit alternatives.

**5.024 Moratorium Alternative.** Impacts under this alternative would be the same as those identified under the above alternatives.

#### **LAND USE**

**5.025 GENERAL PERMIT ALTERNATIVE.** All of the General Permit designated areas occur in or proximate to the population centers of Bullhead City and Parker, Arizona (including the Parker Strip); Needles, Havasu Landing, and Black Meadow Landing, California; and Laughlin, Nevada. Inasmuch as these communities are recreation-oriented, the issuance of the General permit for recreational improvements is consistent with existing land use. Figure 1 illustrates the relationship between existing shoreline improvements (including recreational improvements) based on permits issued over a 7 year period, and General Permit areas.

**5.026 NO-ACTION ALTERNATIVE.** The nature and magnitude of development under this alternative is anticipated to follow the same trends as under the General Permit alternative. Therefore, impacts are as outlined above.

**5.027 PERMIT MORATORIUM ALTERNATIVE.** The moratorium alternative would lead to conflicts with the recreation-oriented nature of the communities proposed for General Permit designation. Restrictions on further development would also lead to conflicts arising from over-use of existing public facilities.

#### **POPULATION**

**5.028 GENERAL PERMIT ALTERNATIVE.** The General Permit alternative would have little effect on the existing demographics of the lower Colorado River. It is possible that issuance of the General Permit could induce minor growth in areas of issuance due to the ease of procuring authorization for shore-line improvements. However, all of the areas within the study area are already heavily developed and significant additional growth would not occur. Figure 1 illustrates that the General Permit areas are located in high density residential areas where significant shoreline improvements have already occurred.

**5.029 NO-ACTION ALTERNATIVE.** The No-Action alternative would not impact current populations or population trends, in that these trends developed contemporaneously with existing Individual Permit procedures.

**5.030 PERMIT MORATORIUM ALTERNATIVE.** It is not likely that future permit restrictions would curtail development in urban portions of the study area due to the availability of recreational opportunities through existing public and private access. However, this alternative could serve to inhibit growth in less densely developed portions of the study area due to restrictions on river access.

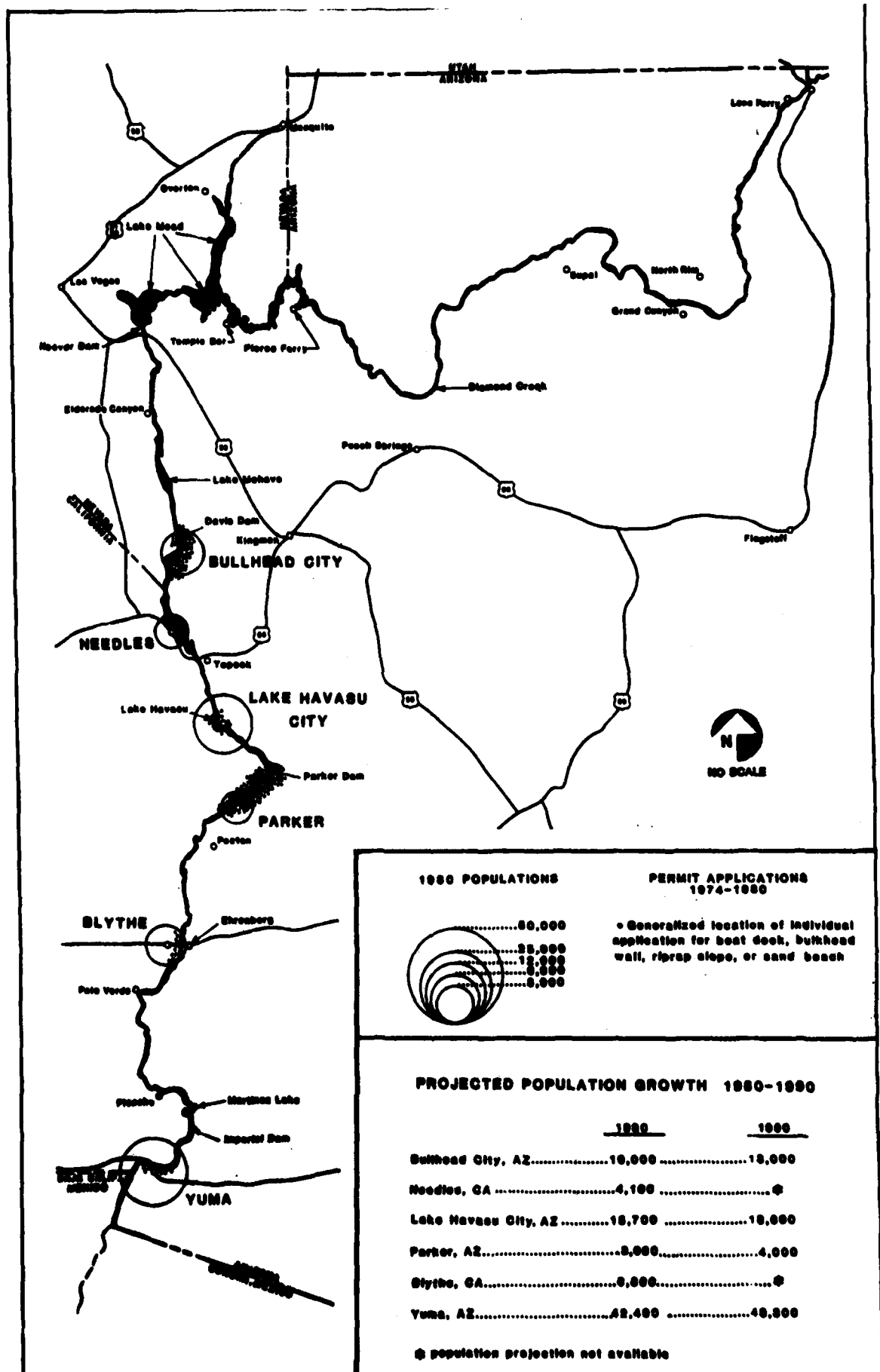


Figure 1: Permitting Trends and Current/Projected Populations Along the Lower Colorado River  
EIS-20

## **NOISE**

**5.031 GENERAL PERMIT ALTERNATIVE.** Noise generation is an indirect result of permitted actions only the extent that private, individual recreational facilities induce river usage. Boat usage could potentially attain equivalent levels with or without the provision of private access. Therefore, to the extent that usage is not dependent upon private moorage, the General Permit alternative would have no impact on ambient noise.

**5.032 NO-ACTION ALTERNATIVE.** Noise generation under the No-Action alternative would be the same as outlined above under the General Permit alternative.

**5.033 PERMIT MORATORIUM ALTERNATIVE.** Inasmuch as a restriction on future permits would not preclude expansion of boating on the river, impacts on noise are the same as outlined above.

## **RECREATION/PUBLIC SAFETY**

**5.034 GENERAL PERMIT ALTERNATIVE.** Under the General Permit alternative, maximum densities of boat docks allowable under the General Permit alternative could result in some recreation conflicts and resultant safety hazards. Maximum build-out would result in restricted shoreline access for anglers. Dock proliferation would impair maneuverability and visibility. Potential safety hazards have, however, been mitigated to some extent through General Permit proposed restrictions on dock dimensions (limiting encroachment into the river and requiring minimum setbacks from adjacent properties) and limitations on density (one individual dock per 50-foot lot, one community dock per 100 feet of frontage). Cumulative development subject to these restrictions would not significantly interfere with navigation or pose significant safety hazards.

**5.035 Impacts to safety resulting from congested use of the river is an impact of the General Permit only to the extent that boat usage is dependent upon dock moorage.** Inasmuch as usage could potentially attain equivalent levels through existing private and public access as through future permitted docks, increases in boat traffic are not considered to be an impact of the General Permit.

**5.036 NO-ACTION ALTERNATIVE.** Maximum build-out of boat docks under the existing individual review procedures would result in some negative impacts on recreation and safety. Because safety impacts are generally the result of cumulative development, they are difficult to assess under an individual review and frequently remain unmitigated. The lack of dimensional restrictions on docks which have attained maximum build-out would result in potentially significant impacts to navigability and therefore to safety.

**5.037 PERMIT MORATORIUM ALTERNATIVE .** A restriction on future permit issuance would not hold safety hazards to their present level, as an increase in boat traffic would still occur as development continues. Safety hazards would potentially increase significantly at existing public access due to over-use and congestion.



## 6.0 LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Impact Statement.

<u>Name</u>	<u>Expertise</u>	<u>Experience</u>	<u>Professional Discipline</u>
<u>Corps of Engineers Staff:</u>			
Joan Drake	Cartography and Remote Sensing	Cartography, UCLA - 1 yr Remote sensing, Corps of Engineers - 1 yr	Geographer
Gleam Enlgh	Environmental Planning	Environmental Planning Corps of Engineers - 8 yrs	Physical Scientist
Kris Nielsen	Environmental Planning	Resource Management, USFS - 1 yr Environmental Planning, Corps - 1 yr	Geographer
Andrea Pickart	Environmental Planning	Environmental Planning Private consulting firms - 1 yr Corps of Engineers - 2 yrs	Physical Scientist
Clifford Rader	Environmental Planning	Environmental Planning, Corps - 2 yrs	Geographer
Steven Schwartz	Archeology	Private consulting firms, 2 yrs Corps archeologist - 2 yrs	Archeologist
Robert Wood (Project Manager)	Environmental Planning	Environmental Planning, Corps of Engineers - 6 yrs Recreation Planning, Corps of Engineers - 3 yrs	Geographer
<u>Consultants WESTEC Services, Inc.</u>			
Deanna Carhill	Social Ecology	Environmental analysis and research, WESTEC Services - 1-1/2 yrs Research Assistant, County Office - 1 yr	Environmental Analyst

LIST OF PREPARERS (continued)

<u>Name</u>	<u>Expertise</u>	<u>Experience</u>	<u>Profession Discipline</u>
Richard Carrioco	Anthropology	Cultural resource evaluation, WESTEC Services, - 8 yrs Historical and archaeological investigations, SDSU - 4 yrs	Archaeologist
Jack Fisher	Biology	Senior field botanist, WESTEC Service - 3 yrs Vegetation analysis, various public agencies - 4 yrs	Botanist
Rosoy Goldberg, Ph. D. Biology		Conducts avifaunal surveys, WESTEC Services - 1 yr Study participant for Museum of Northern Arizona - 4 yrs	Ornithologist
Kurt Kline, Ph. D.	Ecology	Water quality analyses and aquatic resource surveys, WESTEC Services - 1 yr Mollusk culture experimentation, private industry - 8 yrs	Aquatic Biologist
Steve Laoy	Biology	Biological impact investigation and evaluation, WESTEC Services - 8 yrs	Biologist
Helen Moletta	Geography	Social and environmental analysis and research, WESTEC Services - 1 yr	Demographer
Frank Morris	Geography	Historical data gathering and project assessment, WESTEC Services - 4 yrs	Historian
Michael O'Parrell, Ph.D.	Biology	Wildlife and biological resource surveys, WESTEC Services - 3 yrs Lecturing and research, various public agencies and institutions - 10 yrs	Biologist

**LIST OF PREPARERS (continued)**

<u>Name</u>	<u>Expertise</u>	<u>Experience</u>	<u>Profession Discipline</u>
Jerry Oryang	Environmental Planning	Environmental analysis and research, WESTEC Services - 1 yr Environmental research and review, city level - 2 yrs	Land Use Analyst
Thomas Ryan	Environmental Planning	Environmental planning and analysis: WESTEC Service - 1-1/2 yrs Consulting with other firms - 6-1/2 yrs	Project Manager
Diane Schmidt	Resource Management	Environmental analysis and research WESTEC Services - 1-1/2 yrs	Air Quality Specialist
John Westermeyer	Biology	Manager of Life Sciences, WESTEC Services - 4 yrs, Other consulting experience - 4 yrs	Biologist
Connie Willens	Geography	Environmental and planning analysis, WESTEC Services - 5 years	Recreation Planner Safety Analyst

## 7.0 PUBLIC INVOLVEMENT

7.001 PUBLIC INVOLVEMENT PROGRAM. Public concerns over the District's operation of the Corps of Engineer's regulatory permit program along the lower Colorado River were initially solicited at two public meetings held in April 1979, at Bullhead City and Parker, Arizona. Both meetings were heavily attended by riverfront property owners. The primary concern voiced by those present was a desire to expedite the District's permit processing procedure.

7.002 In addition, a public notice describing a preliminary proposed general permit was circulated in May 1979. Response to the notice by public agencies varied. Some agencies were supportive of the general permit concept in the Bullhead City and Parker Strip areas provided that specific conditions were included in the permit to prevent adverse environmental impacts. Other agencies recommended that these areas be closed to the further installation of private structures. A concern common to most agencies was that cumulative environmental impacts be seriously considered in the formulation of any proposed general permit for the lower Colorado River.

7.003 In September 1981, copies of the completed DEIS were mailed to appropriate government entities and other interested groups and individuals. Riverfront property owners were mailed a public information notice that summarized the proposed General Permit, indicated the availability of the DEIS, and announced the time and location of two public meetings to be held in conjunction with the DEIS. A notice of availability was also published in the Federal Register.

7.004 During the 45-day review period for the DEIS, two public meetings were held to consider the proposed General Permit and DEIS; one on 4 November 1981 at Bullhead City, Arizona, and one on 5 November 1981 at Parker, Arizona. Transcripts of these meetings are on file at the L.A. District Office, U.S. Army Corps of Engineers. Comments voiced at the meetings were generally in support of the proposed General Permit. One comment of note was the request that the maximum length for boat docks under the General Permit be adjusted to reflect standard lumber sizes, i.e. four-by-eight foot plywood planks. In response to this request the criterion for maximum length has been increased from 18 to 20 feet.

7.005 REQUIRED COORDINATION. Pursuant to the Fish and Wildlife Coordination Act, the Fish and Wildlife Service was requested to comment on the district's original proposal for a general permit along limited portions of the Colorado River. In a response dated July 13, 1976, the Fish and Wildlife Service concluded that the Service "...favors the development of a general permit for private structures along the lower Colorado River; however we believe this permit must be more specific than the draft proposal; both inclusion and exclusion areas for development must be identified and included in the permit conditions. Also, an environmental impact statement should be prepared which describes cumulative effects of the proposal". The District has complied with suggestion of the Fish and Wildlife Service to prepare an EIS and has included in the document discussion of the cumulative impacts of the permit alternatives. Additional opportunity to comment has been provided to the Fish and wildlife Service thorough formal review of the DEIS. The advice and recommendations of both federal and state fish and wildlife agencies have been adopted to the fullest extent practicable.

7.006 Remaining required coordination consists of obtaining an effect determination from the State Historic Preservation Officer, prior to implementation of the General Permit.

7.007 STATEMENT RECIPIENTS. Table 3 lists agency and group recipients of the DEIS and FEIS.

7.008 PUBLIC VIEWS AND RESPONSES. By holding public meetings, and circulating a public notice to the appropriate government agencies at the outset of project formulation, and by considering past comments on Individual Permit applications, the District was able to determine that there were two major areas of concern with respect to permit applications for construction along the lower Colorado River. First, there exists a strong desire to expedite the current permit process. Issuance of a General Permit would significantly reduce the time required to obtain a permit from the District. Second, the cumulative environmental impacts resulting from the approval of a large number of permits needed to be considered. The development of the General Permit was accomplished with particular attention being paid to cumulative impacts; areas were designated for General Permit authorization only after it was determined that maximum build-out under the specific requirements of the General Permit would not result in adverse isolated or cumulative environmental impacts.

7.009 As a result of the coordination efforts conducted in conjunction with the publication of the DEIS, it was determined that inclusion of all Federal lands under the General Permit was not desirable. Agencies commenting on the DEIS felt that the permitting of actions on Federal lands, some of which are biologically sensitive, divested the state agencies and other entities of adequate opportunity for review. In addition, it was determined that permit actions of a nature to be covered under the General Permit occur infrequently on Federal lands. For these reasons, Federal lands were deleted from the General Permit.

7.010 A further change in General Permit areas was carried out at the request of the Colorado River Indian Tribal Council. The Tribes requested exclusion of Tribal land based on the argument that blanket approval of projects by the Corps would result in the need for CRIT to develop a permitting system in order to retain Tribal input.

7.011 In addition to the above modifications, several other changes to General Permit areas were recommended by Arizona Game and Fish Department, California Department Fish and Game, Nevada Department of Wildlife, and the U.S. Fish and Wildlife Service. These recommendations were based in part on recent fishery studies which revealed several areas of value to the fishery. The agencies also agreed to the expansion of several areas (i.e. Needles, Havasu Landing and Black Meadow Landing) to incorporate areas of low sensitivity and high development which were not initially included.

Table 3. Agency and Group Recipients of the  
Draft and Final Environmental Impact Statement

Reply Received

FEDERAL

Department of Agriculture	
Soil Conservation Service	X
Forest Service	X
Department of Commerce	
National Weather Service	X
National Oceanographic and Atmospheric Administration (not on original mailing list)	X
Department of Defense	
U.S. Army Corps of Engineers	
Department of Energy	
Department of the Interior	
Bureau of Land Management	X
Bureau of Indian Affairs	X
Bureau of Reclamation (reply through Dept. of Interior)	X
Fish and Wildlife Service (reply through Dept. of Interior)	X
Geological Survey	
National Park Service	
Department of Transportation	
U.S. Coast Guard	
Environmental Protection Agency	X
Advisory Council on Historic Preservation	

STATE

Clearinghouses. (Copies of the DEIS were distributed to state agencies of Arizona, California and Nevada by the state clearinghouses; additional copies of the DEIS were also sent to key agencies listed below).

California

Department of Boating and Waterways (reply through state resources agency)	X
Colorado River Board	
Department of Fish and Game (reply through state resources agency)	X
State Historic Preservation Officer	X
Department of Parks and Recreation	
Water Resources Control Board	

Table 3 (Continued).

	<u>Reply Received</u>
<p>Arizona (These agencies replied through the clearinghouse:  Region III Clearinghouse (NACOG), Region IV Clearinghouse  (Dist IV), State Land Department, Arizona Natural Heritage  Program, Department of Health Services)  Bureau of Water Quality Control  Game and Fish Department (reply through state clearing-  house)  Governor's Commission on Arizona Environment  State Historic Preservation Officer  Outdoor Recreation Coordinating Commission  State Parks Board  Water Commission</p>	X
<p>Nevada  Department of Wildlife (reply through state clearing-  house)  State Lands Division  State Water Resources Division</p>	X
<p><u>COUNTIES AND CITIES.</u> (Copies of the DEIS were sent to regional planning  clearinghouses and to appropriate governing bodies of each county or city.)</p>	
<p>Arizona  Coconino County  Mohave County  Yuma County  Lake Havasu City  Parker City</p>	
<p>California  Imperial County  Riverside County  San Bernardino County  City of Blythe  City of Needles</p>	
<p>Nevada  Clark County</p>	
<p><u>TRIBAL GOVERNMENTS</u></p>	
<p>Chamohuevi Indian Tribe  Cocopah Tribal Council  Colorado River Indian Tribes  Fort Mohave Tribal Council  Fort Yuma-Quechan Indian Tribe  Havasupai Tribal Council  Hualapai Tribal Council  The Navajo Tribe</p>	X

Table 3 (Continued)

Reply Received

INTERESTED GROUPS

American Rivers Conservation Council  
Arizona Friends of the Earth  
Arizona Wildlife Federation  
Blythe Chamber of Commerce  
Bullhead City Lions Club  
California Chamber of Commerce  
California Friends of the Earth  
California Natural Resources Federation  
Davis Dam/Bullhead City/Mohave Valley Chamber of Commerce  
El Paso Natural Gas  
Lake Havasu City Chamber of Commerce  
Maricopa Audubon Society  
Metropolitan Water District of Southern California  
Moonridge Property Owners Association  
Museum of Northern Arizona  
National Wildlife Federation  
Parker Chamber of Commerce  
Planning and Conservation League  
Riverside Audubon Society  
Riviera Homeowners Association  
Riverbend Homeowners Association  
San Bernardino County Museum  
San Diego Gas and Electric  
Southern Arizona Environmental Council  
Southern California Edison  
University of Arizona  
University of California, Riverside  
University of Nevada, Las Vegas  
Yuma Chamber of Commerce



7.012 The agencies involved in negotiating changes to the General Permit subsequently furnished letters of concurrence with the agreed upon modifications. Copies of these, and other letters received in response to the DEIS are contained in Appendix EIS-C. Comments requiring a response are summarized and answered in the following paragraphs.

#### U.S. SOIL CONSERVATION SERVICE

7.013 COMMENT: A discussion should be included that indicates the impacts of flooding on the proposed structures. Releases through the dams along the Colorado River would likely impact the proposed structures.

7.014 RESPONSE: The General Permit is compatible with existing release schedules for dams along the Colorado River. In the event that reregulation is proposed for any of these structures, impacts of the modified releases would be addressed in the environmental document prepared by the responsible Federal agency. Evaluation of the reregulation under NEPA would include the impact of the action on existing and anticipated General Permit development.

7.015 COMMENT: You have also stated that an increase in stream sedimentation and a change in flow characteristics will result from installation of the proposed structures. Increased or a change in flooding locations are likely to occur.

7.016 RESPONSE: While some increase in sedimentation and change in flow characteristics may result from the proposed General Permit, these effects were determined to be minor. The text has been modified to reflect the possibility of an increase or a change in flooding locations.

#### NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

7.017 COMMENT: Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments.

7.018 RESPONSE: A review of the horizontal control data for the lower Colorado River supplied by your office, indicates that there are no Geodetic Survey monuments located within the proposed General Permit areas.

#### U.S. BUREAU OF LAND MANAGEMENT, YUMA DISTRICT OFFICE

7.019 COMMENT: The General Permit should favor the use of the community boat docks in areas of private property, instead of allowing the expansion of single-lot structures to maximum density.

7.020 RESPONSE: This viewpoint, and similar viewpoints, have been expressed by several agencies and individuals as the Corps has sought to discharge its regulatory responsibilities on the Colorado River. The formulation of a General Permit and preparation of an EIS are the direct result of the issues thus raised. While the preference for community boat docks over private ones

in certain areas has merit, this Report and EIS have set forth a General Permit which withstands objective environmental and public interest standards. An exhaustive examination has failed to establish the need for a multiple-use criterion for boat docks as suggested in this comment.

7.021 COMMENT: The text should mention the potential for the expansion of shoreline facilities at the Chemehuevi Indian Reservation, along the west shore of Lake Havasu. The Chemehuevi Tribe is presently encouraging recreational and residential development in this area, particularly in the vicinity of the town of Havasu Lake, California.

7.022 RESPONSE: The text of the Main Report (p. 67) has been revised to indicate the potential for recreational expansion at Havasu Lake (Havasu Landing) on the Chemehuevi Indian Reservation. It should be noted, however, that the General Permit applies to areas of Havasu Landing which have already undergone substantial residential development (with related recreational installations). Hence, it is not appropriate to correlate future growth with the issuance of the General Permit.

7.023 COMMENT: Polygonum fusiforme, a candidate species for threatened or endangered classification (Federal Register, December 15, 1980, p. 82532), has been omitted from the list of sensitive plant species.

7.024 RESPONSE: The text has been revised to include this species.

U.S. DEPARTMENT OF THE INTERIOR, OFFICE OF THE SECRETARY

7.025 COMMENT: Although the subject document was intended to accomplish this objective, there is no evidence in the report that indicates cumulative impacts were addressed. Reference is made to information regarding sensitive environmental areas along the river. However, this information and subsequent analyses are lacking. These data should be documented in the EIS.

7.026 RESPONSE: The discussion of cumulative impact analysis in Section 4 of the Main Report (Formulation of the General Permit) has been revised and expanded to more clearly summarize the steps taken to identify and assess cumulative impacts. Resource data is contained in the document entitled "Lower Colorado River Resource Sensitivities and Permit Criteria Report" (October 1981). This document has been incorporated by reference due to the bulk of information involved, and is on file at the Los Angeles District Office. The information on resource sensitivity contained within, particularly as it relates to the selection of the General Permit areas, has been summarized in a series of maps included in Section 4 of the Main Report.

7.027 COMMENT: The General Permit also included beaches, bulkheads, riprap, and community docks, as well as individual boat docks. The potential adverse environmental impacts due to the first four mentioned categories, especially community facilities, are much too great to have them included under a General Permit. They should all be addressed in individual permits and given a level of review commensurate with their potential for environmental impacts.

7.028 RESPONSE: Generic impacts of the structures authorized under the General Permit (including beaches, bulkhead, rip-rap and docks) were analyzed with respect to resource sensitivities at project locations to determine cumulative impacts of the General Permit. The cumulative impact of anticipated maximum installation for each of these types of structures in designated areas was not found to be significant. A more complete discussion of cumulative impact analysis is contained in Section 4 of the Main Report.

7.029 COMMENT: The description of aquatic resources, in particular the section on fishes, has need for significant revision. Information presented suggests a lack of clear understanding of the status of fish fauna in the Colorado River system. In particular, distribution and abundance of native fishes need modification. Reports and work by Nevada Department of Wildlife, University of Nevada, and Arizona State University should be consulted.

7.030 Page 28, Table 2--Throughout the text on fish humpback sucker should be changed to razorback sucker as the accepted common name. The bonytail chub (Gila elegans) is Federally endangered and this is not mentioned in the discussion.

7.031 Page 31, paragraph 4--This paragraph contains incorrect information. Although all three species of native fish have been collected in Lake Mead, the Colorado Squawfish is most likely extinct as a reproducing population and razorbacks and bonytails are extremely rare based on studies by Arizona Game and Fish Department (AGFD) and Nevada Department of Wildlife (NDW). No reliable records for Colorado Squawfish in Lake Mead exist after 1942.

7.032 Page 31, paragraph 6--Lake Mohave supports the largest known population of adult razorbacks in the Lower Colorado River (Bureau of Reclamation (BR), Arizona State University (ASU), Fish and Wildlife Service (FWS) joint surveys 1978-81).

7.033 Page 31--The literature citations for Deacon and Baker 1976 does not agree with reference list on page B-2.

7.034 Page 33, paragraph 5--Recent inventories show that several species of mouthbreeders inhabit the Lower Colorado River. It would be better to simply refer to mouthbreeders or the genus Tilapia.

7.035 RESPONSE: Extensive coordination with state and Federal wildlife agencies during and following the comment period for the DEIS has led to the modification of the geographic extent of the General Permit in order to protect known fisheries of value. A recent study conducted by the California Department of Fish and Game, which was unavailable at the time of General Permit formulation, has been taken into account in instituting changes. The text of the EIS/Main Report has been revised throughout to reflect the substance of your comments.

7.036 COMMENT: Page 38--The discussion of marshes does not accurately reflect the size or distribution. Topock Marsh, the upper end of Lake Havasu, and Imperial Wildlife Refuge all contain marsh areas. The use of the term "tule" after mentioning rushes is questioned. Generally tule is used to describe one or two species of bulrushes. No mention is made of Phragmites which becomes a dominant emergent from Blythe to the Mexican Border.

7.037 Page 22, 3rd paragraph--"Nutrient rich" is a characterization which, is consistent with the most recent data on this segment of the Colorado River. Report by Paulson and Baker (1980-81) should be referenced.

7.038 Page 35, paragraph 5--It should be mentioned that amphipods in River Segment 1 are associated with microscopic algae and submergent vegetation.

7.039 RESPONSE: The text of the EIS has been amended as advised.

7.040 COMMENT: Page 42, Table 3--Please explain "snowfall" values for Blythe and Yuma during the summer months.

7.041 RESPONSE: A discussion of Meteorology/Climatology on page 43 of the Main Report states "As seen in Table 3, summer and winter rains (snow at higher elevations in winter) for each river segment...". The table has been annotated to indicate that snowfall values refer to surrounding high-elevation areas.

#### U.S. BUREAU OF INDIAN AFFAIRS

7.042 COMMENT: Contiguous Bulkhead Wall with Backfill, page 14--As a rule, there would be no problem in connecting with an existing wall on an adjoining property. However, in a General Permit situation, we would recommend that no two General Permits be issued along side of each other without doing a site visit.

7.043 Community Boat Docks, page 20--We would not object to floating boat docks, however, when General Permits are requested immediately adjacent to each other, then, an on-site inspection should be completed.

7.044 Contiguous Rip-rap Slope, page 20--Our previous comment would apply in this situation. It would also disclose if the slope is stable at the previous site, and allow for modification of material, or perhaps, change of site, or result in no issuance of a permit.

7.045 RESPONSE: It is probable that the General Permit would result in the construction of adjoining bank stabilization or adjacent boat docks. The cumulative impact of such development has been evaluated and determined to be small and consistent with public interest. The cumulative analysis incorporated field reconnaissance of proposed General Permit areas. Restrictions and conditions of the General Permit were imposed in order to insure that all actions taken under its authority are in the public interest. If case-by-case site investigation were required for these actions, this would defeat the purpose of the General Permit.

7.046 COMMENT: Sand Beach, page 20--A few concerns would be that material "containing not more than 12 percent silt by volume" and "associated grading activities not more than 5 feet riverward of the ordinary high water mark" not be the only things considered in addition to the 60 feet in length requirement. The "Sandy Beaches" should be (1) compatible to the site, and (2) energy of the system should be evaluated to examine if a sandy beach could possibly be retained in that particular site. Therefore, we would recommend that whenever two General Permits are requested within approximately 1 mile of each other, an on-site visit should be planned.

7.047 RESPONSE: Inadequate engineering could theoretically be a problem. In practice, however, there is sufficient motivation, particularly economic, for developers to insure that their stabilization projects are not wasted. Past projects tend to support this premise, although permitting of sand beaches in general (and small projects in particular) has been infrequent along the lower Colorado River.

#### U.S. ENVIRONMENTAL PROTECTION AGENCY

7.048 COMMENT: The Draft Environmental Impact Statement (DEIS) and the Main Report do not clearly explain or graphically demonstrate the areas covered by the permit; nor do the documents explain why certain small areas are excluded. A synopsis of the criteria used to include or exclude river segments should be included in the FEIS. Also, the maps should be revised or more clearly annotated to reflect the existing structures, land ownership, institutional use, and sensitive resource areas.

7.049 RESPONSE: The maps delineating General Permit areas in the DEIS and Main Report have been refined to include greater detail and precision; this should serve to clarify areas of issuance. A description of criteria used to include or exclude river segments, along with maps depicting land ownership, institutional use, sensitive resources and other resource parameters is detailed in the document entitled "Lower Colorado River Resource Sensitivities and Permit Criteria Report" (October 1981). This document is on file at the L.A. District Office, U.S. Army Corps of Engineers, and has been circulated to appropriate reviewing agencies, including E.P.A. Due to the bulk of material involved, the contents of the document were not presented in their entirety in the DEIS. However, the Main Report has been expanded (refer to Section 4: Formulation of the General Permit) to include a series of maps depicting the location of sensitive resources, land-use conflicts, and other constraining factors which led to the selection of General Permit areas. In addition, past permitting trends and current population trends for the lower Colorado River are depicted in Figure 1 of the EIS.

7.050 COMMENT: The proposed General Permit appears to include almost the entire lower Colorado River. As stated on page EIS-3, the inclusion of all Federal lands adjacent to the river is based on the rationale that "the General Permit will be subservient to the planning policies of the managing Federal agencies, and such policies are subject to analysis under the National Environmental Policy Act (NEPA)." Although the 404 Permit and NEPA procedures dovetail, they do not exactly duplicate each other. It is doubtful that the existing environmental assessment process under NEPA will satisfy all of the requirements under section 404 of the Clean Water Act (CWA). Furthermore, the DEIS does not demonstrate that the affected Federal agencies understand and accept this responsibility.

7.051 Federal Guidelines at 40 CFR 230.7(b)(2) state:

Activities otherwise similar in nature may differ in environmental impact due to their location in or near ecologically sensitive areas.

Inclusion of all Federal lands in the area permitting avoids the issue of resource sensitivity at specific sites. If permit activity is unlikely to occur in parks and established wildlife refuges, these areas should be excluded from the General Permit.

7.052 RESPONSE: The initially proposed General Permit areas bordering Federal lands were not based on resource sensitivities or predicted impacts and therefore make no supposition of impact similarity in these areas. The areas were designated on the premise that impact analysis and adequate mitigation would be conducted under existing Federal regulations. The Corps agrees, however, with the other arguments presented in this comment. For this reason, and in response to the contention of various state agencies that reviewing privileges for Federal actions would be curtailed by the General Permit, Federal lands have been excluded from the Permit.

7.053 COMMENT: The proposed General Permit would not regulate the number of beaches that can be developed, in spite of the fact that Appendix A, page A-11 notes that increased flow velocity and increased sedimentation may result from the construction of beaches.

7.054 RESPONSE: The determination that no significant impact would occur from the construction of individual sand beaches under the General Permit is based on the maximum levels of construction anticipated under the Permit. Past permitting trends indicate that construction of single-lot beaches is extremely infrequent. In the event that the construction of beaches under the General Permit exceeds the anticipated levels and the potential for significant impact occurs, the District Commander would reevaluate the validity of the General Permit as it applies to this action. Appropriate measures would then be taken to insure that a significant impact does not occur.

7.055 COMMENT: Bulkhead construction is regulated to allow construction adjacent to existing structures. If "existing structure" is interpreted to mean any structure existing at the time of the proposed new construction (as opposed to structures that exist at a defined point in time, the effective date of the permit), then it is possible that for undefined miles of the river, bulkhead structures could be erected one after another, resulting in "higher stream velocities and an increased potential for sediment transport and scouring." The discussion on page A-13 goes further to note that "Two hundred to three hundred feet of bulkheads along a fast flowing section of river could have significant effects of fish populations and stream characteristics."

7.056 Although we acknowledge that the authorized structures allowed under the proposed General Permit are of minimal impact individually, the potential impact of these activities in the total area of the proposed permit is definitely not minimal. The FEIS should address more directly the issue of cumulative impact and necessary mitigation measures for the protection of the river. The General Permit should include provisions for mitigating these cumulative impacts.

7.057 RESPONSE: The cumulative of total bulkhead development was considered in the DEIS only for those areas of the initially-proposed General Permit for which this level of ultimate build-out was anticipated. The potential impact of maximum installment in the total area was not deemed insignificant; rather it was not viewed as an expected impact in areas under Federal ownership and various Native American lands. If significant development were found to occur

in these areas following issuance of the General Permit, the Permit would be reexamined in these areas, and appropriate action taken to prevent the possibility of a cumulative impact.

7.058 The General Permit has since been modified in geographical scope to include only areas where heavy development (including bulkhead walls) has already occurred. These areas were selected on the basis of low resource sensitivity, including the absence of valuable fisheries. The General Permit does include conditions to mitigate cumulative impact; the stipulation that the bulkhead adjoin an existing revetment is designed to preserve stream characteristics and minimize scouring and deposition. The analysis of cumulative impacts for the General Permit-designated areas of the Colorado River concluded that impacts of cumulative construction of bulkhead walls for these areas would not be significant.

7.059 COMMENT: The Main Report and DEIS adequately address the air quality effects of the proposed General Permit. There are, however, a few inaccuracies that should be corrected.

1. In Table 4, page 44, the Federal standard (primary and secondary) for ozone should be  $235 \text{ ug/m}^3$  (0.12 ppm) (see 40 CFR 50.9).
2. In Table 4, page 44, the Federal standard (primary and secondary) for lead is  $1.5 \text{ ug/m}^3$ , maximum arithmetic mean averaged over a calendar quarter (see 40 CFR 50.12).
3. In the first paragraph on page 45, the report states that the EPA classifies the areas (Navajo power plant near Page and Mohave power plant near Bullhead City) as non-attainment. The statement should be revised to say that only the Navajo/Page area has been classified as non-attainment.

7.060 RESPONSE: The text of the Main Report has been amended as advised.

#### STATE OF CALIFORNIA OFFICE OF HISTORIC PRESERVATION

7.061 COMMENT: The Office of Historic Preservation cannot complete its review of the environmental document referenced above without additional information. A copy of the cultural resources assessment report prepared for the proposed project should be submitted to this office for incorporation into our review process.

7.062 RESPONSE: The requested report was sent, and contact was made with Mr. Michael Rondeau, Staff Archeologist at the Office of Historic Preservation. We have received no further response to date. Prior to implementation of the General Permit, the Final EIS and a more detailed cultural resources report will be forwarded to SHPO with an official request for a determination of effect.

## ARIZONA GAME AND FISH DEPARTMENT

7.063 COMMENT: Mention is made in the subject document of biologically sensitive areas, and yet, these areas are not well documented, adequately discussed, nor are they designated as such on maps of the study area (A-1 through A-14). Furthermore, the cumulative impacts (a major concern for and aspect of the study and DEIS) are not well documented or discussed.

7.064 RESPONSE: A set of maps which identify and delineate sensitive resources along the lower Colorado River is contained within the Corps document entitled "Lower Colorado River Resource Sensitivities and Permit Criteria Report", October 1981. The report is on file at the L.A. District Office, and has been circulated to appropriate public agencies (including AGFD) and interested parties. Due to the bulk of material involved, the document has been incorporated herein by reference. However, a map has been included in the Final EIS/Main Report which illustrates the location of sensitive resources as they relate to the selection of General Permit areas. In addition, the discussion of cumulative impact assessment has been expanded and clarified (see Section 7 Main Report).

7.65 COMMENT: A major contention of the Department, regarding docks or projections into the public waterway, is that they either preclude public use of the shoreline or near shore area, or they interrupt this use, particularly by boat fishermen, but also by other boating recreationists. Whether or not the adjacent terrestrial land is privately owned should make no significant differences in the decision-making for a protruding structure.

7.66 RESPONSE: It is recognized that the presence of boat docks and other waterfront improvements restrict the use of the shoreline by anglers. However, boat docks and sand beaches provide alternative recreational uses of the shoreline. The rights of a property owner to protect his property, and to recreate in a chosen fashion should be balanced with the public angling privilege. Shoreline development under the General Permit would potentially restrict a maximum of approximately 18 river miles of shoreline from complete public access. Six hundred and eighty-eight (688) rivermiles outside of the designated areas between Lee's Ferry and the Mexican border remain accessible to shoreline anglers.

7.067 COMMENT: In the State of Arizona, since the state owns the submerged land from the ordinary high waterline to the center of the river or stateline, for most of the length of the subject study area, the State Land Department would have to issue a permit to build on or over the State land, no matter whether the adjacent land is federally or privately owned. If this is the case, it would seem that all permit applications would have to be reviewed, individually, rather than be handled by a "general permit".

7.068 RESPONSE: Standard Condition (g) of the General Permit states that the General Permit does not "...obviate the requirement to obtain State or local assent required by law for the activity authorized herein". The Arizona State Land Department would retain full permit authority over State Lands within the General Permit areas. However, as a courtesy to the various state agencies which have in the past relied upon the Corps' Public Notice to aid in the



discharge of their regulatory or licensing responsibilities, the Corps will notify State Land and Game and Fish agencies when an action occurs under the authority of the General Permit. This process has been incorporated into the General Permit as Special Condition (f).

7.069 COMMENT: In comparing the three alternatives and the impact discussions pertaining to each, it is unclear as to how the No-Action alternative would result in the maximum build-out of boat docks and bulkhead/riprap alignments, unless the Corps approved all applications for such structures, regardless of impacts.

7.070 RESPONSE: The impact discussion pertains to the effects of only those five types of activities authorized under the General Permit. The General Permit authorizes only single-lot improvements including boat docks, bulkhead walls, rip-rap slopes and sand beaches. Due to the relatively small magnitude of these actions, when evaluated on a case-by-case basis they do not pose a potential for significant impacts. Under the No-Action alternative, these actions would continue to be evaluated in a piece-meal fashion, rendering the evaluation of cumulative impact difficult or impossible. Therefore, on a worst-case basis, all applications for single-lot improvements could potentially be approved.

7.071 COMMENT: Page 22, Paragraph 3--The statements addressing the water quality in Segment 1 of the Colorado River are inaccurate. Phosphorus loading in Lake Mead has decreased 80-90 percent since the completion of Glen Canyon Dam, and Upper Lake Mead is considered oligotrophic. Furthermore, the nitrogen level in Lake Mead is considered satisfactory (Prentki, Paulson, and Baker, 1981).

7.072 Page 27, Paragraph 5--The last sentence is incorrect. More endangered species are located in the upper river segments than in the lower segments of the Colorado River.

7.073 Page 27, Paragraph 6--The bonytail chub, and the Colorado squawfish are two additional endangered species which may occur in this portion of the Colorado River. Suttkus and Clemmer (1977) and Minckley (1973) are two additional references to the presence of the humpback chub occurring in the Colorado River mainstream.

7.074 Page 28, Table 2--Corrections in this table are needed as follows:

- Humpback chub is federally-listed endangered species;
- Bonytail chub is a federally-listed endangered species and probably does not occur in subareas B and C of Segment 2.
- Roundtail chub (Gila robusta seminuda) occurs in the Virgin River.
- Colorado squawfish is a federally-listed endangered species, and does not occur in Segment 2.
- Woundfin does not occur in Subarea C of Segment 2, but does occur in the Virgin River.

- Razorback sucker (Xyrauchen texanus) requires addition to the native species list and occurs in Segment 1 and subareas A, B, and C of Segment 2.
- Threadfin shad occur in Segment 1.
- Yellow bullhead occur in Segment 1.
- Striped bass occur in Segment 1.

7.075 Pages 29 and 30--These maps should reflect the revisions suggested for Table 2, Page 28.

7.076 Page 31, Paragraph 3--Striped bass and channel catfish should be added to the list of species which enter the mainstream near Spencer and Surprise Canyons.

7.077 Page 31, Paragraph 5--The flannelmouth sucker is not legally used as a bait species. The mountain sucker is legally used as a bait species in lake Mead.

7.078 Page 31, Paragraph 6--Largemouth sucker is more numerous in Lake Mohave than it is in Lake Mead. The humpback sucker is more numerous in Lake Mohave than it is in Lake Mead.

7.079 Page 31, Paragraph 7--A bonytail chub was caught by an angler below Davis Dam on July 14, 1979.

7.080 Page 32, Top of Page--Take and possession of white sturgeon is not prohibited. Arizona allows to take with no bag or possession limit.

7.081 Page 32, Paragraph 1--The fish fauna in the main channel from Davis Dam to Lake Havasu is not sparse or absent. Threadfin shad, striped bass, rainbow trout, channel catfish, and carp are all common in this portion of the river.

7.082 Page 32, Paragraph 2--The last sentence is inaccurate. Striped bass concentrate below Davis Dam during spawning, as well as utilize numerous eddies and pool areas from Davis Dam to Topock.

7.083 Page 32, Paragraph 3--Striped bass also frequent backwaters to seek out prey species such as threadfin shad.

7.084 Page 34, Paragraph 3--The last sentence is inaccurate. Upper Lake Mead is oligotrophic, Boulder Basin is mesotrophic and Las Vegas Bay (which is the most productive area) is mesotrophic to eutrophic (Prentki, Paulson and Baker, 1981). Eutrophic conditions have probably been uncommon since the completion of Glen Canyon Dam.

7.085 Page 35, Paragraph 5--Corbicula sp. are extremely common throughout Lakes Mead and Mohave.

7.086 Page 42, Table 3--The data presented in this table is very confusing and grossly inaccurate.

7.087 Page 66, Paragraph 3--The first sentence should read "...are associated directly or indirectly with boating." This wording would be more accurate and would include fishing and pleasure boating activities.

7.088 Page 66, Paragraph 5--The first sentence should read--Laughlin, Nevada, rather than Riviera, Nevada.

7.089 Page 68, Paragraph 4--The following statement appears:

"Public Safety is not a major issue at Lake Havasu. For the most part, the marinas, docks, and campgrounds along the shore of the lake are spread widely enough apart to reduce potential problems."

The Department's boating records for total accidents, accidents with injuries, and accidents with fatalities rank Lake Havasu as either 1, 2, or 3 for all years since 1974. Furthermore, the Pittsburgh Point area has the potential to become an area of significant safety problems if developed over the current level. The London Bridge Channel area is already a problem area. Overall, the Department believes public safety is a major issue at Lake Havasu.

7.090 Page 71, Paragraph 7--The Yuma Division of the river has considerable fishing use.

7.091 Page 74, Paragraph 3--The third sentence should read--The Lake Mead and Lake Mohave portions of the river have designated areas where motorized boating is prohibited...

7.092 Page EIS-14, Section 4.28--This section should make reference to "Threatened and Unique Wildlife of Arizona", approved by the Arizona Game and Fish Commission.

7.093 Page EIS-14, Section 4.29, Mammals--Those species which are listed in "Threatened and Unique Wildlife Arizona", approved by the Arizona Game and Fish Commission, which occur in the permit area should be mentioned.

7.094 Page EIS-15, Section 4.34 Reptiles and Amphibians--This section should list those reptiles found in "Threatened and Unique Wildlife of Arizona", the official State list.

7.095 **RESPONSE:** The text of the EIS/Main Report has been revised to reflect the substance of your comments.

7.096 **COMMENT:** Page 65, Under Recreation/Public Safety, 1st Paragraph--The following statement appears:

"There is little, if any, coordination among the agencies, as to exactly what function each performs."

This statement is inappropriate in a document of this type. The authorities of the various agencies are not necessarily distinct from each other and there are many cases of concurrent jurisdiction. The laws of the State of Arizona only apply in the State of Arizona although they may be enforced by (from the

list in the text of the document) the Arizona Game and Fish Department, the Arizona State Parks Department, the Yuma City Police Department, and the Sheriff's Department of Yuma and Mohave Counties. In addition to those mentioned, any Arizona peace officer may enforce Arizona State Law along the Colorado River within the State of Arizona. There is coordination and cooperation between the various local state and Federal agencies in the field level.

7.097 RESPONSE: The text has been amended as advised.

7.098 COMMENT: Page EIS-25, Section 5.13--The following statement appears:

"Construction of bulkhead and riprap alignments would potentially result in removal of a limited amount of vegetation near the shoreline, including remnants of mulefat, mesquite, or willow. The cumulative loss of these plants is not considered significant because of the small number and extent of the community."

While the amount in actual value of riparian vegetation may be low, it can be a very important component of the habitat for birds and small mammals. In addition, the overhanging vegetation (over the water) provides an important source of food for fishes, as it harbors a variety of insect life.

7.099 RESPONSE: It is recognized that remnant riparian vegetation is an important habitat component. The cumulative loss of minor riparian stands is considered to be an unavoidable adverse impact of the General Permit Alternative. However due to the limited cumulative extent of remnant vegetation the impact is not considered to be significant or to warrant mitigation. It should be emphasized that, in areas characterized by cottonwood/willow, mesquite, or mesquite/mix communities, the General Permit was not issued in order to avoid impacting these habitats.

#### NEVADA DEPARTMENT OF WILDLIFE

7.100 COMMENT: The State of Nevada claims sovereign right to lands below normal high water mark of navigable bodies of water. It appears that responsibility for these lands cannot be given under a general permit system to other agencies.

7.101 RESPONSE: By Federal regulation, and regardless of overlapping jurisdictions, the Corps of Engineers retains jurisdiction for the purpose of regulation on the Colorado River. The Corps' jurisdiction extends laterally to the entire water surface and bed of the river including all the land and waters below the Ordinary High Water Mark. Issuance of the General Permit does not divest the State of Nevada of its jurisdiction, nor would it constitute transfer of these responsibilities to another agency.

7.102 COMMENT: The problem of shoreline access for recreation was not adequately addressed. Piers, bulkheads, and docks can impair or restrict movement of shore anglers. This is particularly critical on bordering private lands, where trespass is involved above the normal high water level.

7.103 A discussion of the impact of the General Permit and No-Action Alternatives on shoreline access for recreation has been included in the FEIS under Environmental Impacts: Recreation/Public Safety.

#### COLORADO RIVER INDIAN TRIBES

7.104 COMMENT: The Tribes note that neither they nor other Indian Tribes are listed in the Main Report as governmental agencies with land use regulatory authority. (Main Report pp. 5-7). Rather, the Tribes are listed in the Environmental Impact Statement as a "Native American Group," evidently with a status similar to the other "Interested Groups" who are listed. (EIS p. 36.) The Tribes object to this characterization of their status and authority regarding the lands within their territorial boundaries. Tribes are distinct sovereign governments, with authority over the use and disposition of lands within their boundaries. The Colorado River Indian Tribes do not recognize any authority of either the California or Arizona Departments of Fish and Game over lands within the Tribes' boundaries.

7.105 RESPONSE: The text has been revised to reflect the governmental role of Tribes as discussed in pages 5-7 and throughout the EIS/Main Report.

7.106 Second, the Tribes note that prior to the receipt by the Tribes of notice of the public hearing held in Parker, Arizona on November 5, 1981, the Tribes were never informed of the proposed General Permit, nor were they ever consulted. The regulations in 40 CFR Part 1500, which implement the National Environmental Policy Act, 42 U.S.C. sec. 4321 et seq., provide that a Tribe may be a cooperating agency (secs. 1501.6; 1508.5); required that Tribes be consulted during the "scoping" process (sec. 1501.7); and provide that close consultation with Tribes is required generally where actions are considered which effects reservations (e.g., sec. 1506.6(b)(3)(ii)).

7.107 RESPONSE: Franklin McCabe, Tribal Representative for the Colorado River Indian Tribes, was contacted by telephone on 11-15-79, and by letter on 10-19-79 and 11-19-79, for the purpose of gaining information on CRIT's use of the river, its sensitive areas and other resources and to arrange a meeting to discuss the Corps proposal with respect to the Tribes. A meeting was convened on 10 April 1981, attended by a Corps representative and by Mr. Charles Lamb, Administrator for the CRIT Museum and acting as a delegate for the Tribes. The meeting was followed up with a further written communication from CRIT, regarding items of concern to the Tribes in the context of the Corps study. The above communications are documented in the Preliminary Environmental Resources Inventory Report, Vol. I (1981).

7.108 COMMENT: Further, some lands shown as under Federal ownership are claimed by the Tribes, and the Tribes have never been informed that the Federal Government claims adversely to the Tribes. (See, e.g., lands on California side of Colorado River between RM 127.0 and RM 128.5.)

7.109 RESPONSE: Land bordering the Colorado River on the California side between RM 127 and 128.5 was incorrectly classified as under Federal ownership in the DEIS. This designation has been corrected as advised.

APPENDIX A  
GENERAL PRINCIPLES  
LONG COLONIAL SYSTEM

## TO WHOM IT MAY CONCERN:

The Commander, Los Angeles District, Corps of Engineers announces the issuance of a General Permit authorizing the installation and maintenance of the following single-lot improvements to riparian property on designated portions of the Lower Colorado River in California, Arizona, and Nevada:

1. Contiguous Bulkhead walls
2. Contiguous Rip-rap slopes
3. Sand beaches
4. Individual boat docks
5. Community boat docks

This permit is issued in accordance with the provision of 33 CFR 320, 322, 325, 326, and 329, entitled "Regulatory Program of the Corps of Engineers" which provides that the Commander may issue a General Permit for activities which are substantially similar in nature, that cause only minimal adverse environmental impacts when performed separately, and have minimal adverse cumulative effects on the environment. Upon issuance of a General Permit, all activities meeting the established criteria are approved and will not require the submission of an Individual Permit. Any actions not specifically authorized by this General Permit are subject to a Department of the Army Individual Permit authorization requiring a case-by-case evaluation in accordance with 33 CFR Parts 320, 322, and 325.

This General Permit specifically authorizes the installation and maintenance of the following structures:

1. Bulkhead wall with backfill (not to exceed 60 feet in length).

This structure consists of a vertical wall aligned equally with existing authorized adjacent bulkhead walls or rip-rap slopes and extending not more than 1 foot riverward of the Ordinary High Water Mark, except where such an encroachment is necessary to provide equal alignment with adjacent bulkhead walls. Material used as backfill shall consist of suitable material, free from toxic pollutants in other than trace quantities. This General Permit is not applicable to bulkhead walls which do not provide a contiguous structure with existing authorized bulkhead walls or rip-rap slopes on adjoining upstream and/or downstream properties.

2. Rip-rap slope (not to exceed 60 feet in length).

This method of bank stabilization consists of large rocks and boulders piled to produce a stable, loosely consolidated structure lining the bank, and aligned equally with existing authorized adjacent rip-rap slopes or

bulkhead walls. Material used for rip-rap shall consist of suitable material, free from toxic pollutants in other than trace quantities. This General Permit is not applicable to authorized rip-rap slopes which do not provide a contiguous structure with existing rip-rap slopes or bulkhead walls on adjoining upstream and/or downstream properties.

3. Sand beach (not to exceed 60 feet in length).

The authorized action consists of the placement of imported sand-sized material and/or prior grading of the riverbed extending not more than 4 feet riverward of the Ordinary High Water Mark. Material used for beach creation shall consist of suitable material (containing not more than 12 percent silt by weight) free from toxic pollutants in other than trace quantities.

4. Individual boat docks.

This category includes any structure or combination of structures extending over the river and used primarily for provision of boat moorage, but which may also be used for sunbathing, fishing, or swimming. Such structures include, but are not limited to: floating docks with pipe pilings, fixed docks, cantilevered docks, and floating ramps. This General Permit is not applicable to the following:

(a) A structure or combination of structures extending over the main river channel for a distance greater than 30 feet from the low water line, or extending riverward more than 5 percent of the distance between the mean low water line on each river bank as measured perpendicular to the shoreline.

(b) Docks greater than 20 feet along their longest dimension.

(c) Structures equipped for fueling, lubricating, or otherwise servicing boats.

General authorization for the above-defined dock-related structures is granted subject to the following conditions.

1. No more than one dock may be constructed adjacent to a single (50-foot) lot. Individual docks are excluded from riparian parcels served by community facilities.

2. All structures must meet the test of non-interference with navigation, as it relates to river access of adjoining properties as well as hazard to general navigation.

3. Structures shall not utilize styrofoam floats unless measures to prevent ingestion by wildlife are proven adequate. Such measures may include covering styrofoam floats with indoor/outdoor carpeting or wire mesh.

4. Structures shall not be painted with anti-fouling paints.

5. The minimum width of any structure used to provide passage shall be 6 feet, or 3 feet if equipped with railing.



6. Structures shall require a minimum 5-foot setback from adjacent property boundaries projected over the water surface.

5. Community boat docks.

Community boat docks are docks which provide moorings for more than one boat and jointly serve more than one property owner. Community boat docks consist of fixed and/or floating structures and may have one or multiple access points or gangways. This General Permit is not applicable to the following structures:

- (a) Community docks with greater than five moorings.
- (b) Structures or combinations of structures extending over the main channel of the river for a distance greater than 30 feet from the low water line, or extending riverward more than 5 percent of the distance between the mean low water line on each river bank as measured perpendicularly to the shoreline.
- (c) Structures equipped for fueling, lubricating, or otherwise servicing boats.

General authorization for the above-defined docks is granted subject to the following conditions:

- 1. Community boat docks require a minimum river frontage of 100 feet.
- 2. All structures must meet the test of non-interference with navigation as it relates to river access of adjoining properties as well as hazards to navigation.
- 3. Structures shall not utilize styrofoam floats unless measures to prevent ingestion by wildlife are proven adequate. Such measures may include covering styrofoam floats with indoor/outdoor carpeting or wire mesh.
- 4. Structures shall not be painted with anti-fouling paints.
- 5. The main float shall be a minimum of 6 feet wide.
- 6. Finger floats shall be a minimum of 3 feet wide.
- 7. Finger floats shall be a maximum of 20 feet in length.
- 8. Structures shall require a minimum of 5-foot setback from adjacent property boundaries projected over the water surface.

Typical drawings, depicting the most common types of installations that are covered by this General Permit, are included in this notice along with a series of maps showing those areas where the General Permit is applicable.

This General Permit is issued for period of five (5) years from the effective date of the permit.

## DEFINITIONS:

(a) The term "Ordinary High Water Mark" is the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter or debris; or other appropriate means that consider the characteristics of the surrounding areas.

(b) The term "affected area" is that geographical area within which direct or indirect effects of the proposed work and/or structures, if permitted, could reasonably be expected to occur. This is the area of potential environmental impact and, in most cases, will exceed the limits of the permit area.

## SPECIAL CONDITIONS

(a) That the permittee shall notify the Commander in writing at least 30 days prior to initiation of the work. This notification shall include:

1. A sketch or plan of the proposed structure showing pertinent dimensions and location of the Ordinary High Water Mark.
2. The location of the proposed structure by Lot and Tract number.
3. The name, address, and telephone number of the permittee.
4. A photograph of the proposed structure site and a photograph of immediately adjacent properties as viewed upstream and downstream from the proposed structure site.
5. A description of the purpose and intended use of the proposed structure.

(b) That the Commander may, upon reviewing the information supplied under special condition (a) determine that the action is not appropriate under this General Permit, and require an individual evaluation in accordance with 33 CFR Parts 320, 322, and 325. Such a determination will normally be made within 20 days of notification by the permittee.

(c) That this General permit does not authorize any structure whose affected area includes a National Register site or a potentially eligible site which is known but not yet evaluated under 36 CFR 64.

(d) That the cultural resources data base shall be updated each year by the Corps of Engineers District Archeologist. Data obtained through the updating process will be used to refine the General Permit areas.

(f) That the Commander, upon notification of intent to construct by an applicant and determination that the action is authorized under the General Permit, shall notify the following regulatory and licensing agencies for the States of California, Nevada, and Arizona:

1. California Department of Fish and Game
2. Arizona Game and Fish Department
3. Nevada Department of Wildlife
4. California State Lands Department
5. Arizona Lands Department
6. Nevada Division of State Lands

**STANDARD CONDITIONS:**

(a) That all activities identified and authorized herein shall be consistent with the terms and conditions of this General Permit; and that any activities not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this General Permit which may result in the institution of such legal proceedings as the United States Government may consider appropriate, whether or not this General Permit has been previously modified, suspended, or revoked in whole or in part.

(b) That the discharge will not adversely affect a threatened or endangered species as identified under the Endangered Species Act or the critical habitat of such species.

(c) That the permittee agrees to make every reasonable effort to prosecute the work authorized herein in a manner so as to minimize any adverse impact of the work on fish, wildlife, and natural environmental values.

(d) That the permittee agrees to prosecute the work authorized herein in a manner so as to minimize any degradation of water quality.

(e) That the permittee shall permit the Commander or his authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this General Permit is in accordance with the terms and conditions prescribed herein.

(f) That the permittee shall maintain the structure or work authorized herein in good condition and in accordance with the drawings attached hereto.

(g) That this General Permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to property or invasion of rights of any infringement of Federal, State, or local laws or regulations, nor does it obviate the requirement to obtain State or local assent required by law for the activity authorized herein.

(h) That this General Permit does not authorize the interference with any existing or proposed Federal Project and that the permittee shall not be entitled to compensation for damage or injury to the structures or work

authorized herein which may be caused by or result from existing or future operations undertaken by the United States in the public interest.

(i) That this General Permit may be summarily suspended, in whole or in part, upon a finding by the Commander that immediate suspension of the activity authorized herein would be in the general public interest.

(j) That in issuing this permit the Government will rely upon the information and data which the permittee must provide in connection with special condition (a) of this permit. If such information and data prove to be false, or inaccurate, the permittee's authorization may be suspended or revoked.

(k) That this General Permit may be either modified, suspended, or revoked, in whole or in part, if the Secretary of the Army or his authorized representative determines that there has been a violation of any of the terms or conditions of this permit or that such action would otherwise be in the public interest. Any such modification, suspension, or revocation shall become effective thirty (30) days after publication of written notice of such action which shall specify the facts or conduct warranting same.

(l) That any modification, suspension, or revocation of this General Permit shall not be the basis for any claim for damages against the United States.

(m) That no attempt shall be made by the owner to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized by this General Permit.

(n) That if the display of lights and signals on any structures or work authorized herein is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the permittee.

(o) That if and when the permittee desires to abandon the activity authorized herein he must restore the area to a condition satisfactory to the Commander.

(p) That there shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein.

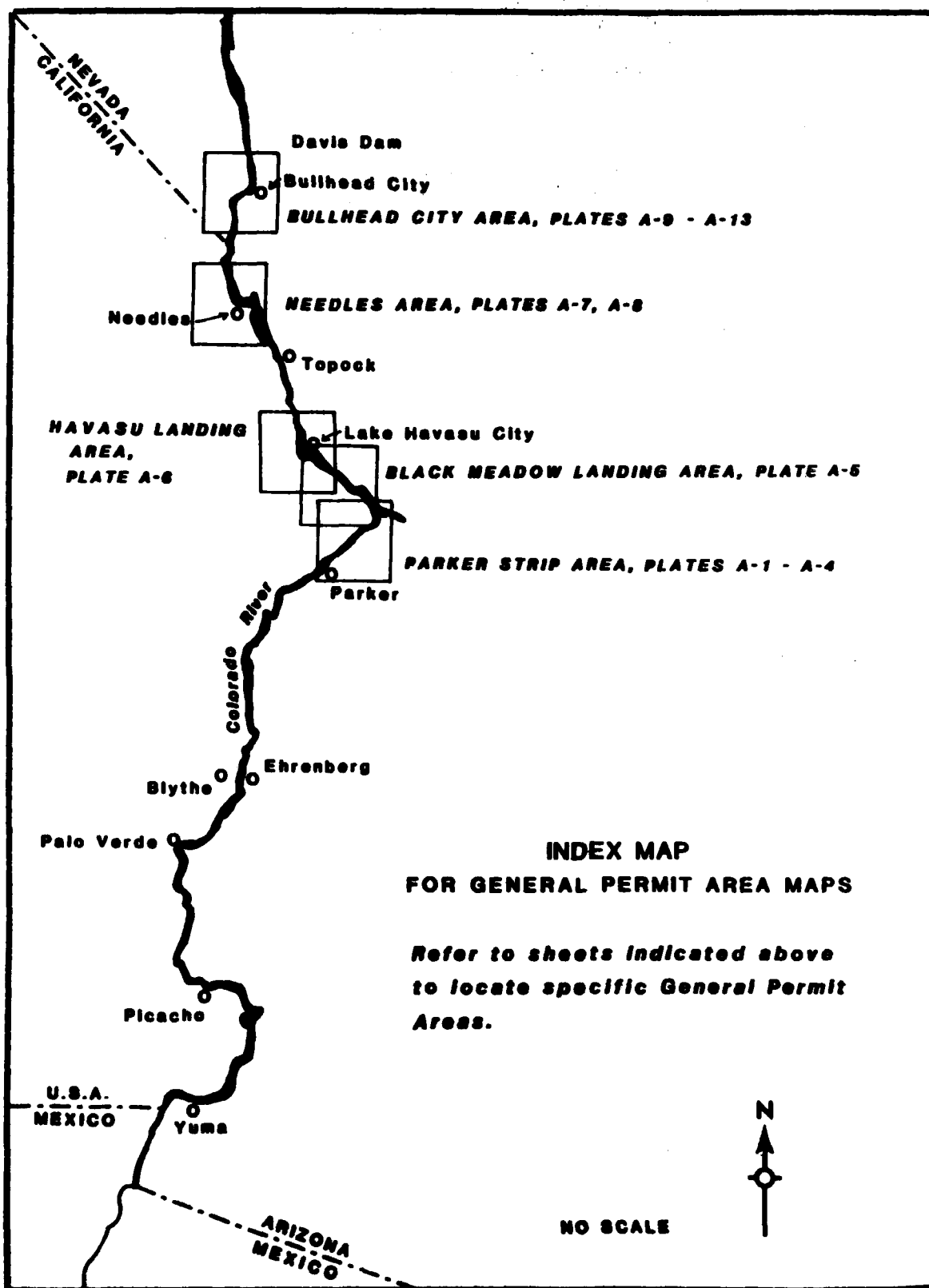
(q) That the permittee hereby recognizes the possibility that the structure permitted herein may be subject to damage by wave wash from passing vessels. The issuance of this General Permit does not relieve the permittee from taking all proper steps to insure the integrity of the structure permitted herein and the safety of boats moored thereto from damage by wave wash and the permittee shall not hold the United States liable for such damage.

(r) That items of potential historical, archeological, or scientific significance which are discovered in the course of construction activities shall be carefully preserved in situ pending a determination by the Corps of Engineers of their significance and appropriate disposition.

GENERAL PERMIT AREAS:

The General Permit as put forth herein shall apply to the areas designated on the following series of maps, Plates A-1 through A-13.

The Index Map in Figure A-1 locates the General Permit maps along the lower Colorado River.



**FIGURE A - 1**

CALIFORNIA

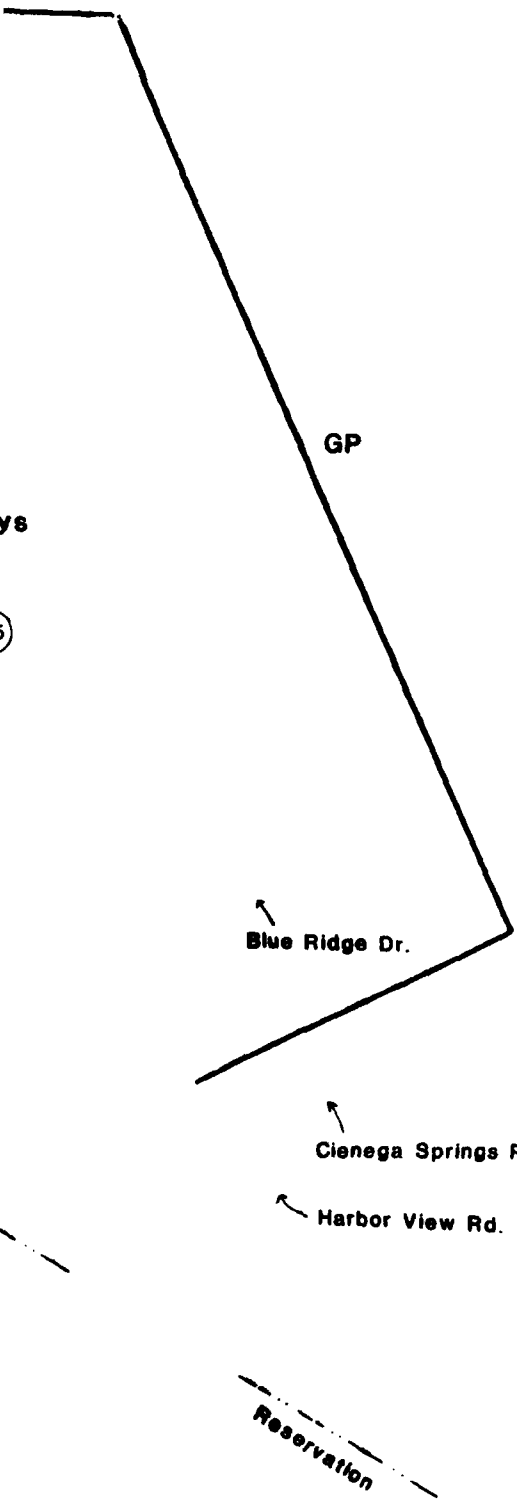
Lake Moovaiya Keys

95

Highway

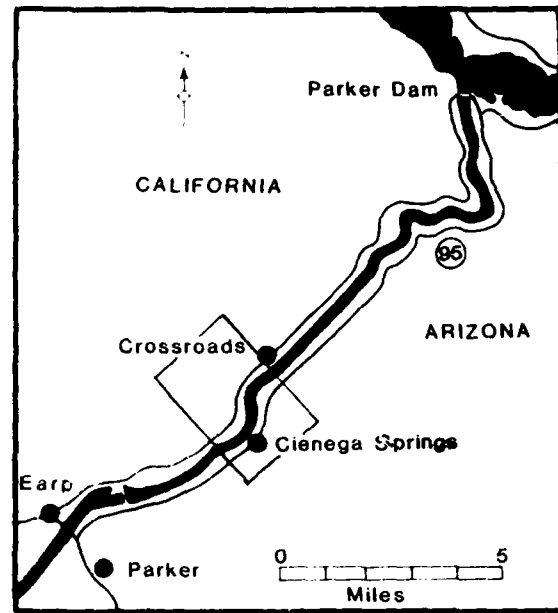
Colo Co Hwy

Indian



ARIZONA

# LOCATION MAP



## GENERAL PERMIT AREA

GP

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

## RIVER MILES

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

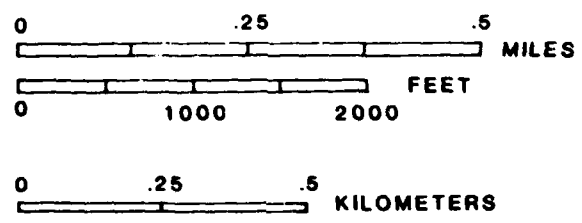
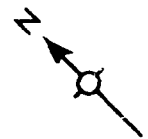


PLATE A-1  
GENERAL PERMIT AREAS  
PARKER STRIP 1

2



AD-A171 640

LOWER COLORADO RIVER PROPOSED GENERAL PERMIT MAIN  
REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT (U) ARMY  
ENGINEER DISTRICT LOS ANGELES CA APR 82

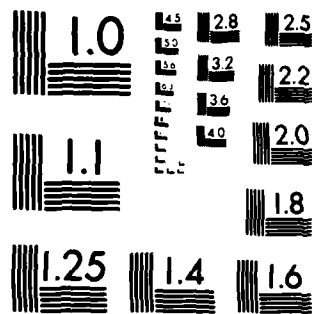
3/4

UNCLASSIFIED

F/G 6/6

NL





XEROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963 A



CALIFORNIA

San-Park Dam Highway

Alt-Ville

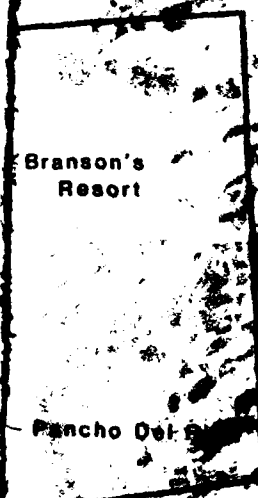
Park

95

184

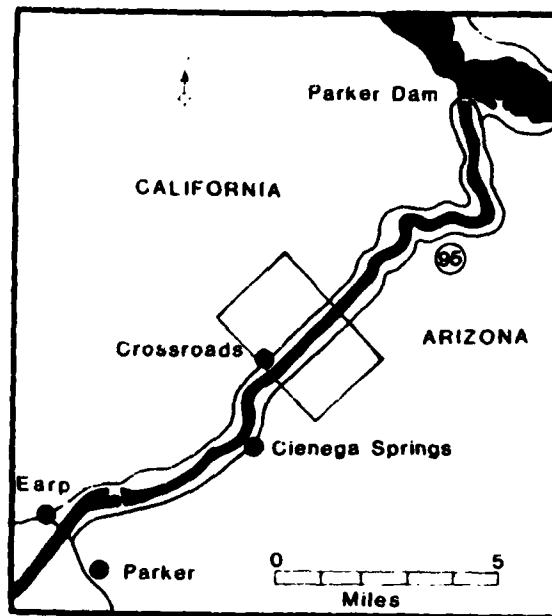
Br

183



ARIZONA

# LOCATION MAP



## GENERAL PERMIT AREA

GP

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

## RIVER MILES

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

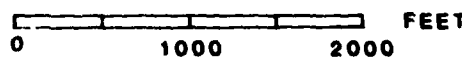
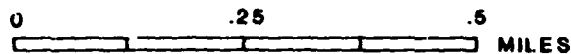
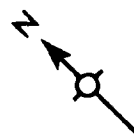


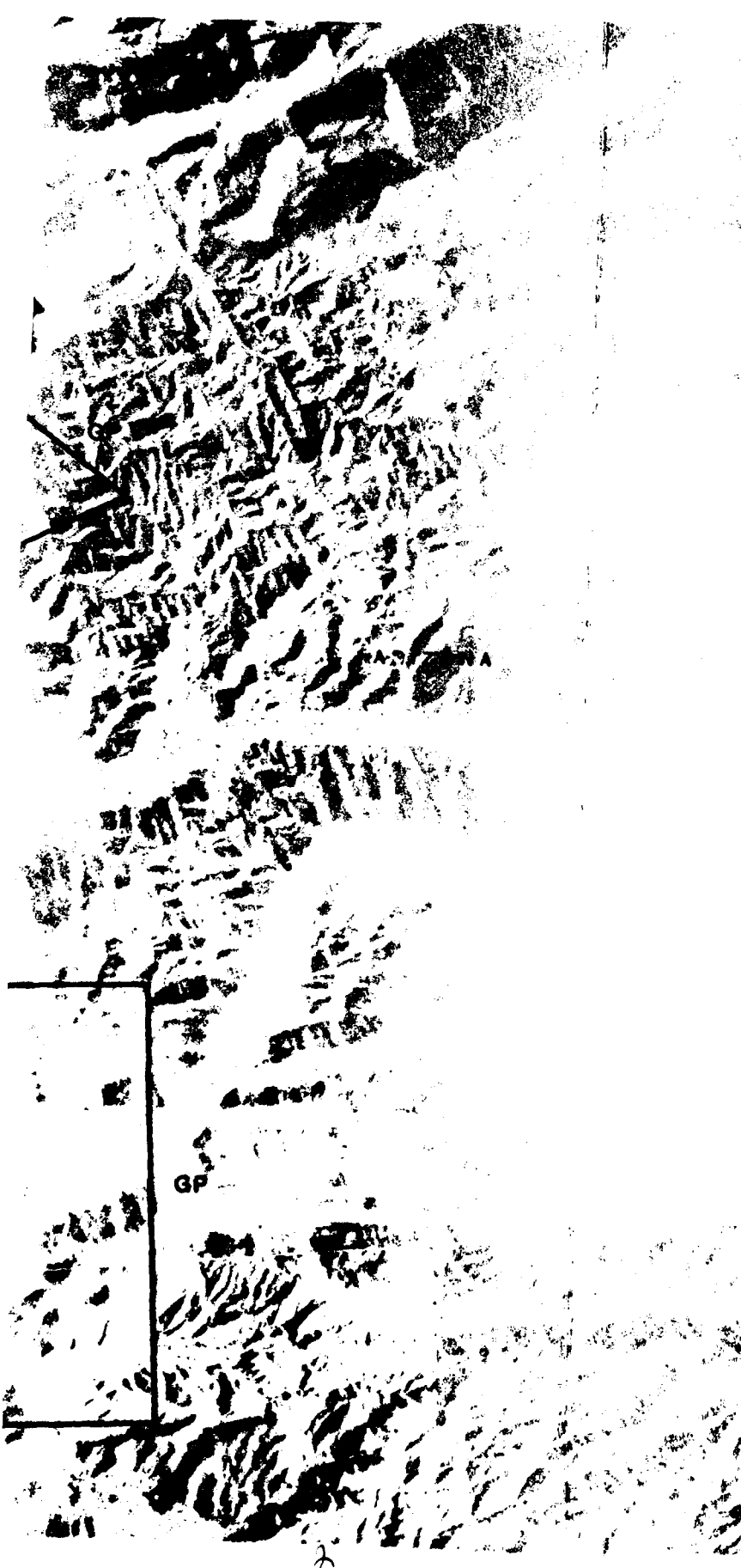
PLATE A-2  
GENERAL PERMIT AREAS  
PARKER STRIP 2

Sun

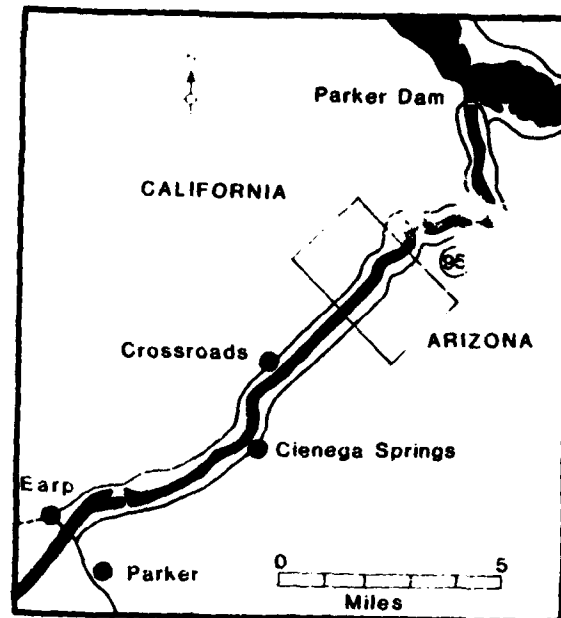
CALIFORNIA

Eastpark Highway

Rockrunner  
Restaura



LOCATION MAP



GENERAL PERMIT AREA

GP

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

214

RIVER MILES

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

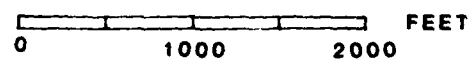
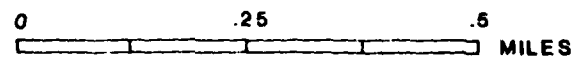
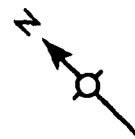


PLATE A-3  
GENERAL PERMIT AREAS  
PARKER STRIP 3

Parker Dam

Havas

National

Wildlife

Refuge

Transmission  
Station

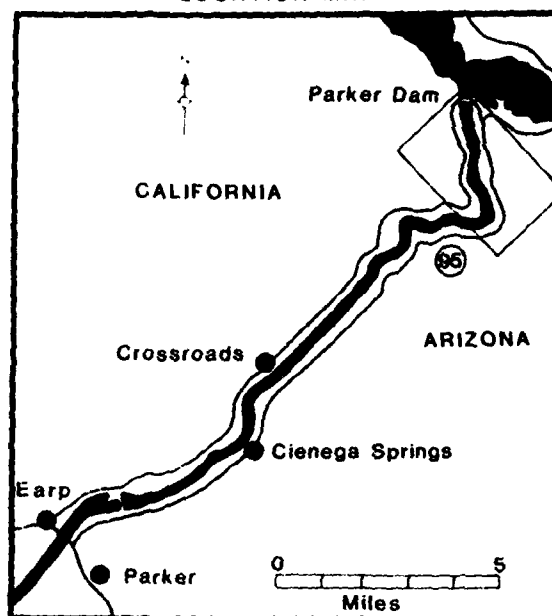
Bluffs  
Trailer Park

98

Parker Dam Highway

ARIZONA

## LOCATION MAP



## GENERAL PERMIT AREA

GP

(applies only to shoreline of  
main channel -- does not apply  
to islands, tributaries or  
backwaters)

GP

Bighorn Dr.

River Bend Dr.

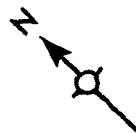
Holiday Harbor  
Beach

boat ramp

## RIVER MILES

214

(taken from Pacific Southwest  
Inter-Agency Committee,  
River Mile Index, 1976)



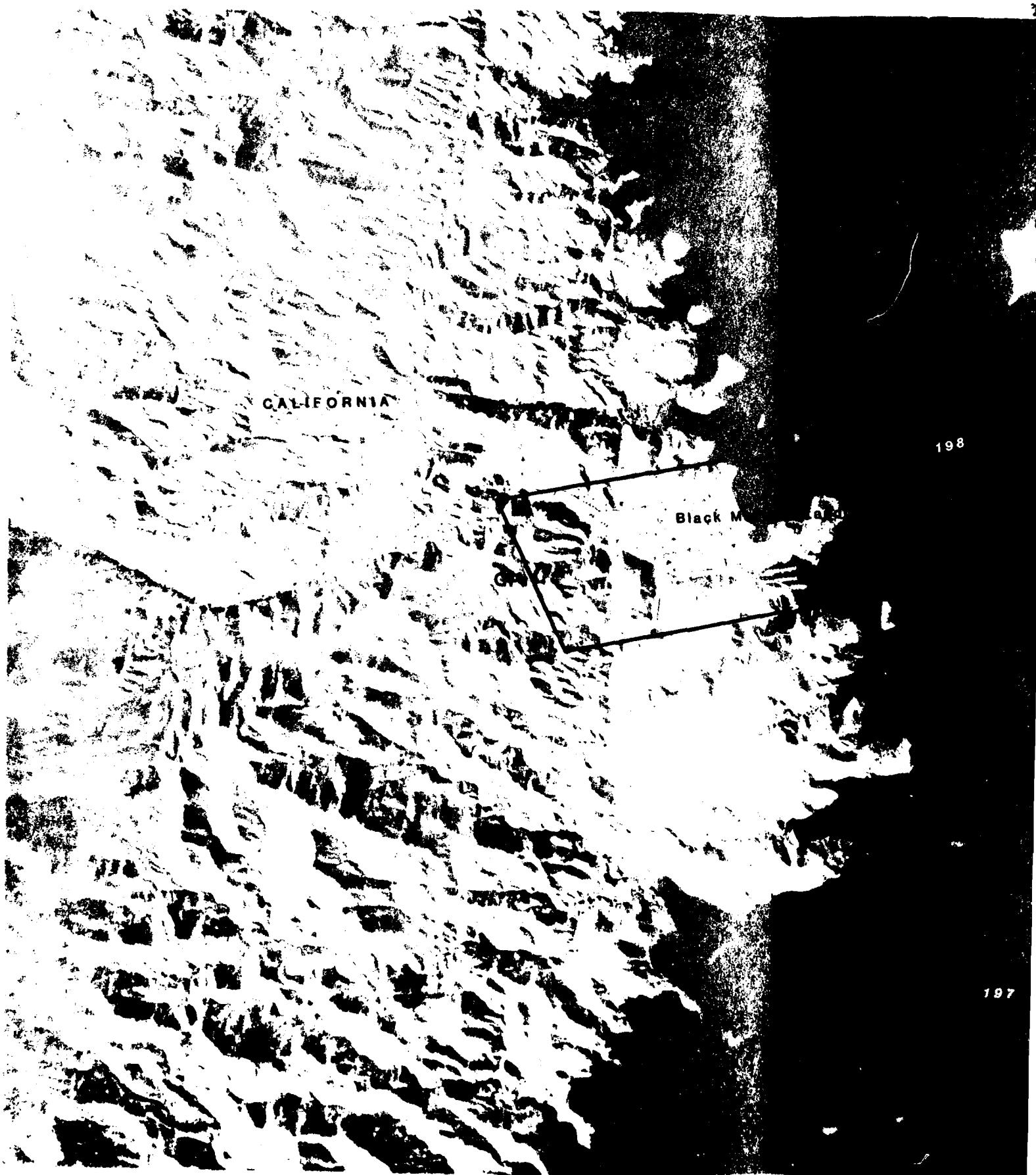
0 .25 .5 MILES

0 1000 2000 FEET

0 .25 .5 KILOMETERS

PLATE A-4  
GENERAL PERMIT AREAS  
PARKER STRIP 4



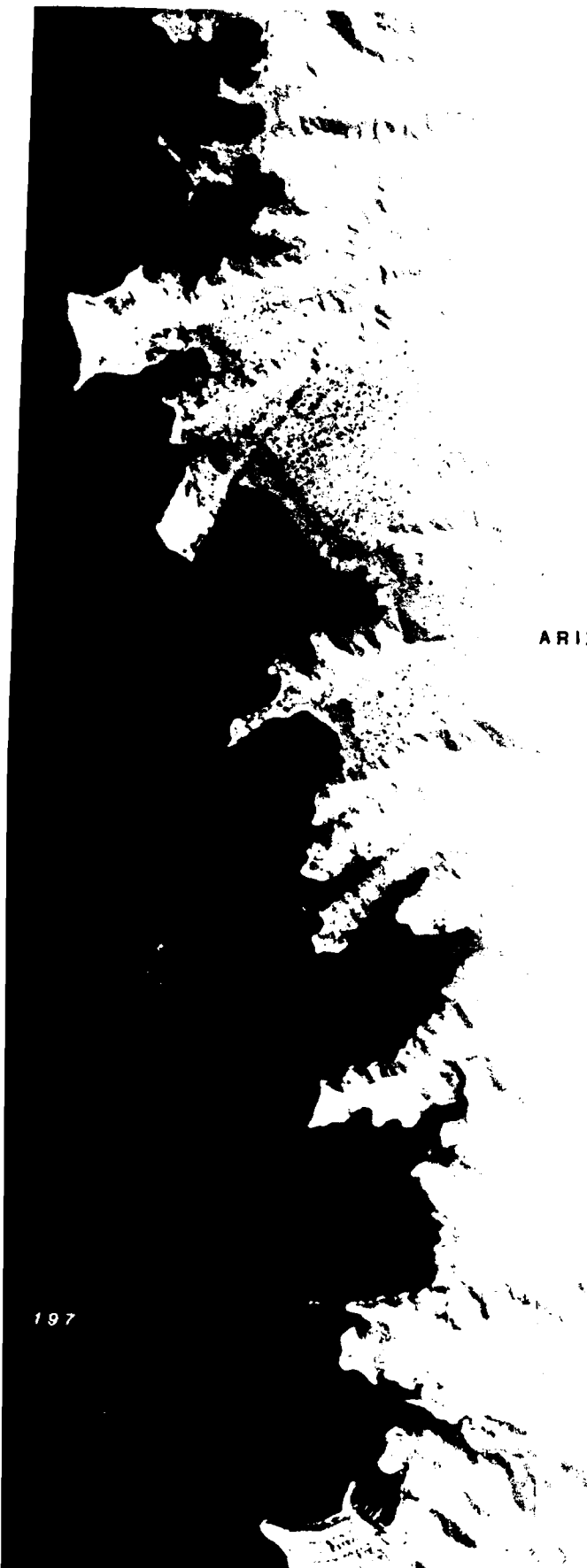


CALIFORNIA

Black Mountain

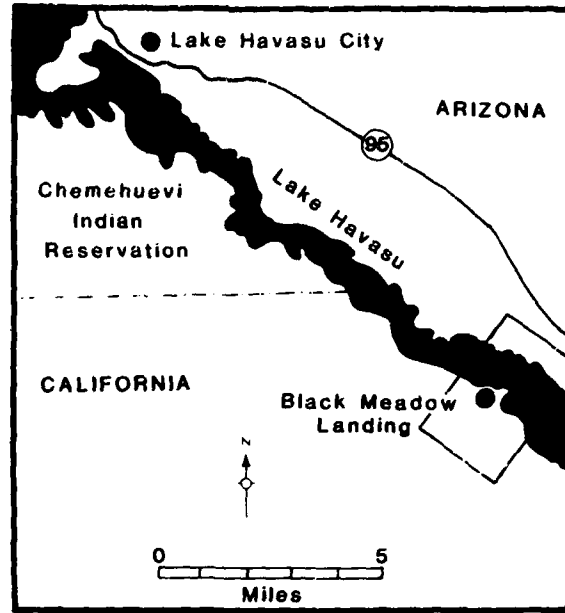
198

197



2

# LOCATION MAP



ARIZONA

GP

## GENERAL PERMIT AREA

(applies only to shoreline of  
main channel -- does not apply  
to islands, tributaries or  
backwaters)

## RIVER MILES

214

(taken from Pacific Southwest  
Inter-Agency Committee,  
River Mile Index, 1976)

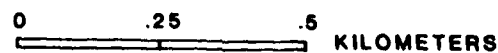
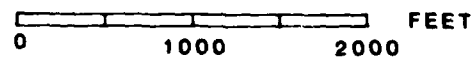
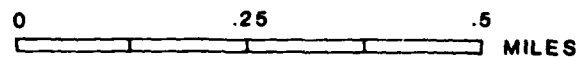
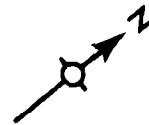
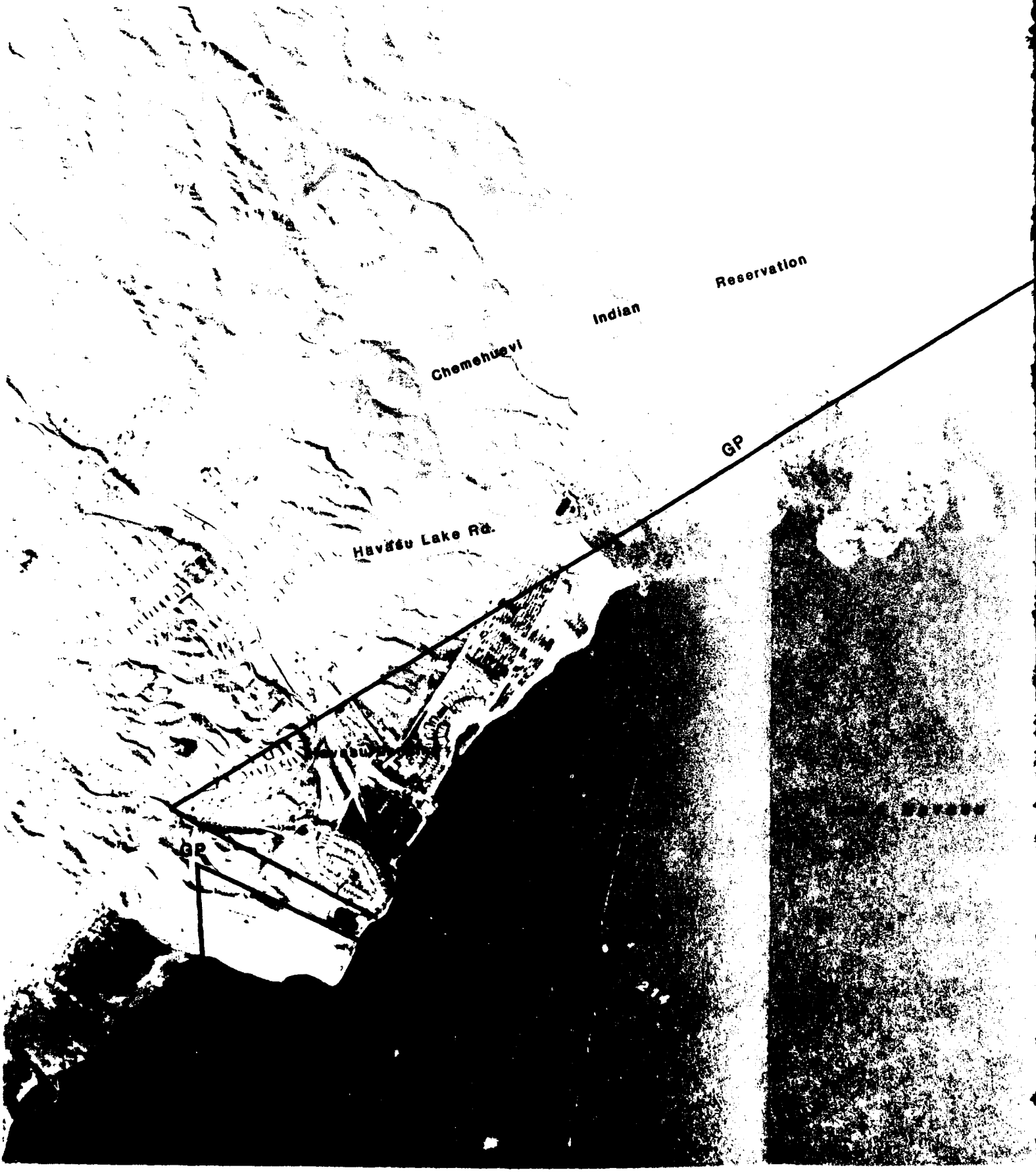


PLATE A-5

GENERAL PERMIT AREAS

BLACK MEADOW LANDING



Reservation

Indian

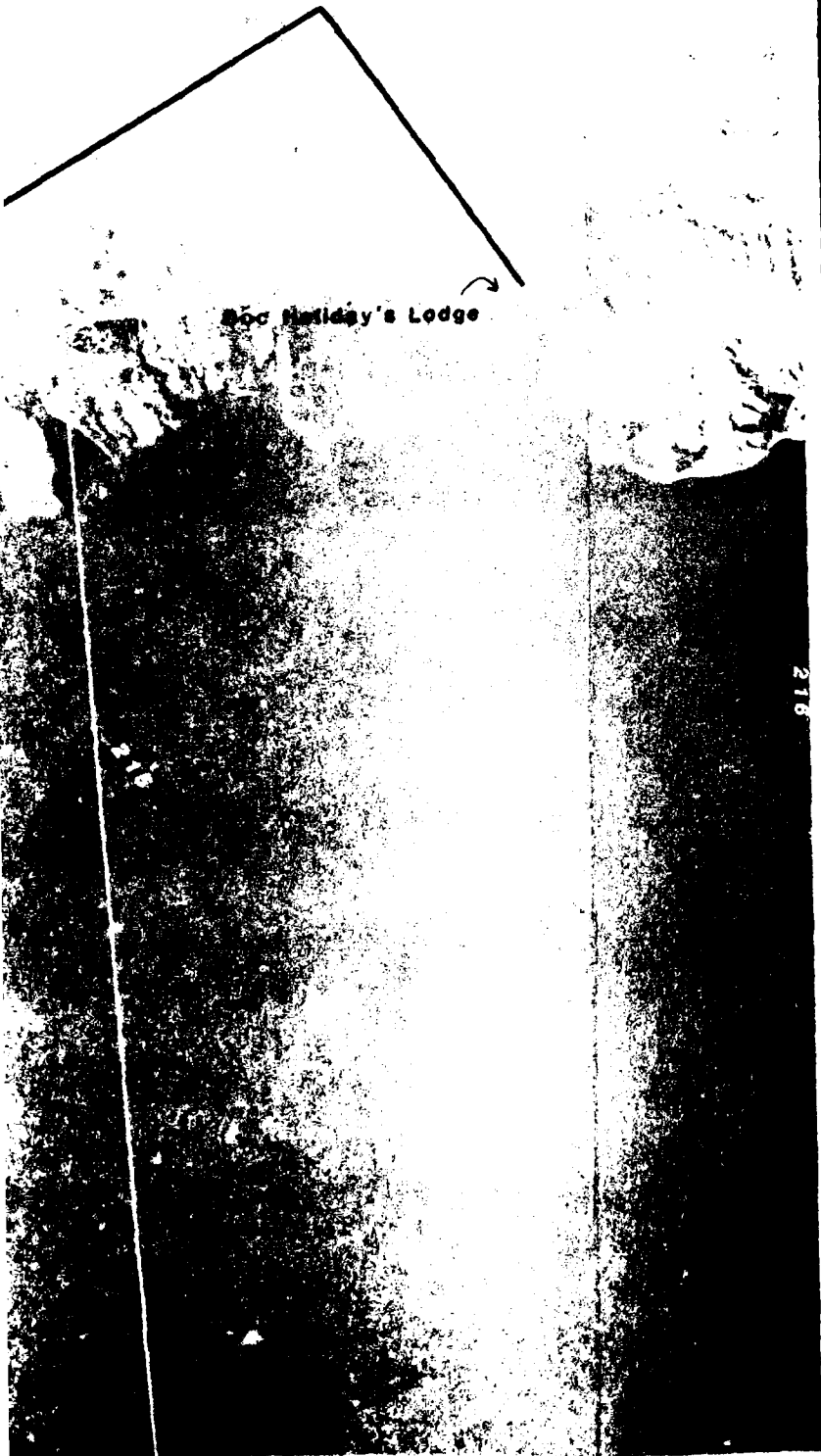
Chemehuevi

GP

Havasu Lake Rd.

GP

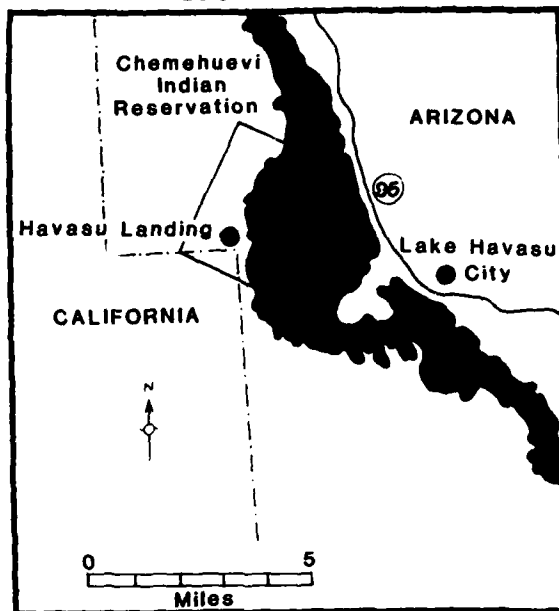
214



Hoc Holiday's Lodge

216

# LOCATION MAP



## GENERAL PERMIT AREA

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

GP

## RIVER MILES

214

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

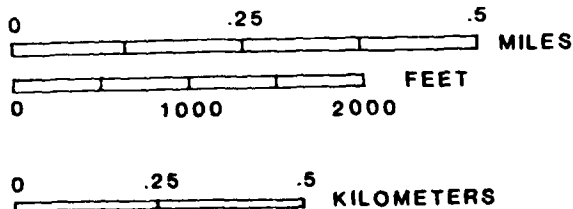
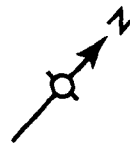


PLATE A-6

GENERAL PERMIT AREAS

HAVASU LANDING

**C**

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1

7

ed on next map sheet

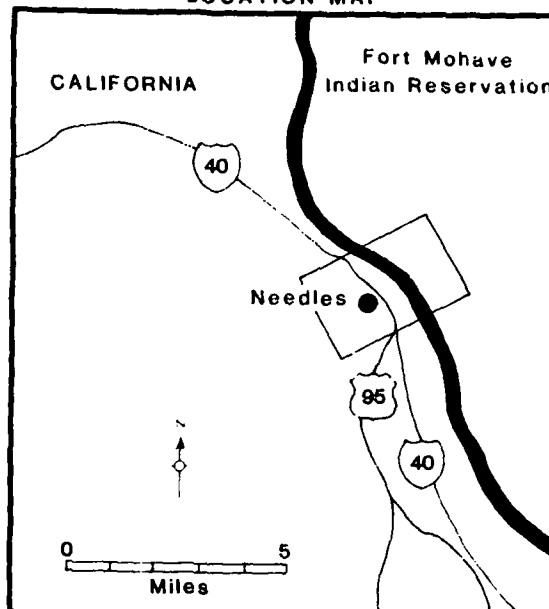
GP

95



ARIZONA

# LOCATION MAP



## GENERAL PERMIT AREA

GP

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

## RIVER MILES

214

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

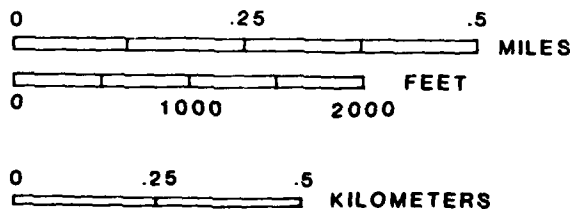
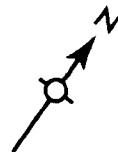


PLATE A-7  
GENERAL PERMIT AREAS  
NEEDLES 1

2

Rainbo Beach Marina  
and Mobile Home Park

National Old Trails Rd.

GP

River Rd.

9780

GP

683 Dyer Rd.

Gartwright Rd.

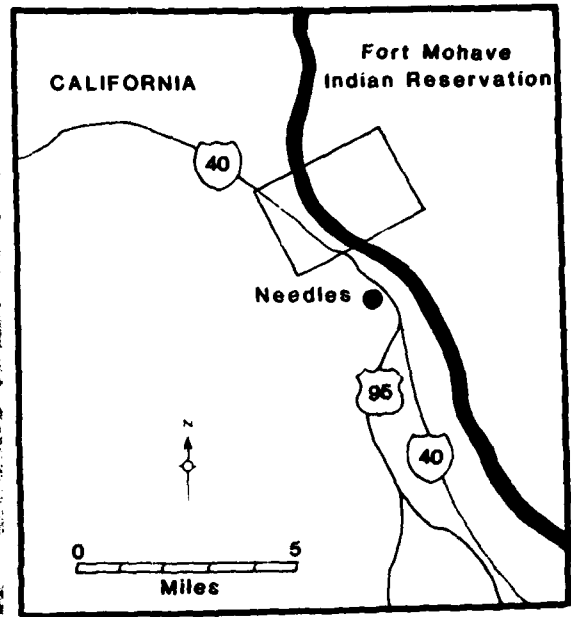
40

River Road

CALIFORNIA

GP

# LOCATION MAP



## GENERAL PERMIT AREA

GP

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

## RIVER MILES

214

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

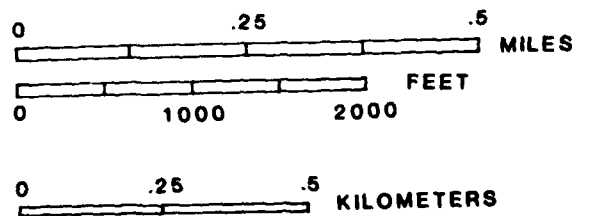


PLATE A-8  
GENERAL PERMIT AREAS  
NEEDLES 2



267

**Hancock Rd**

## Big Bend

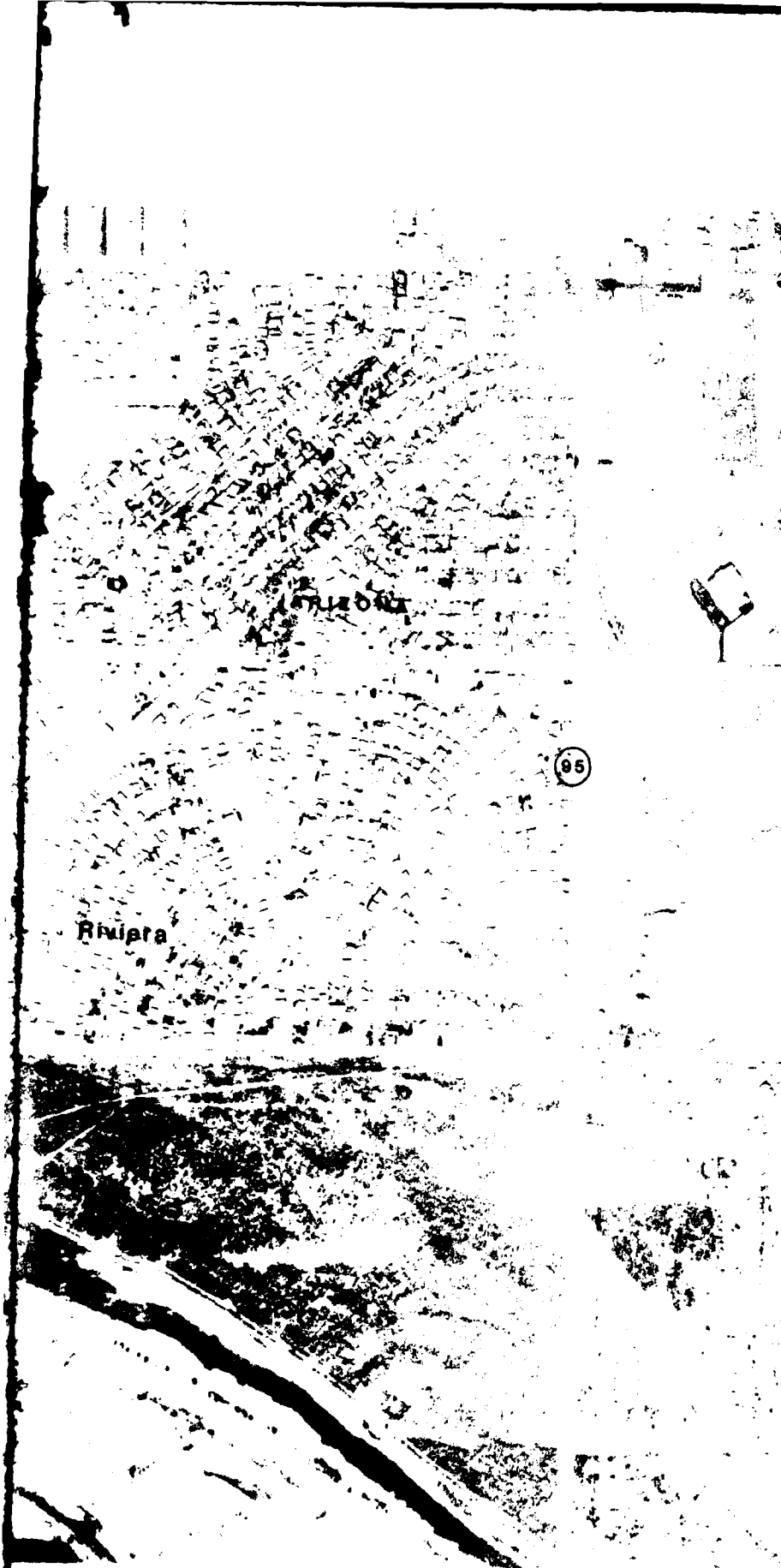
Marina Blvd

# GGT

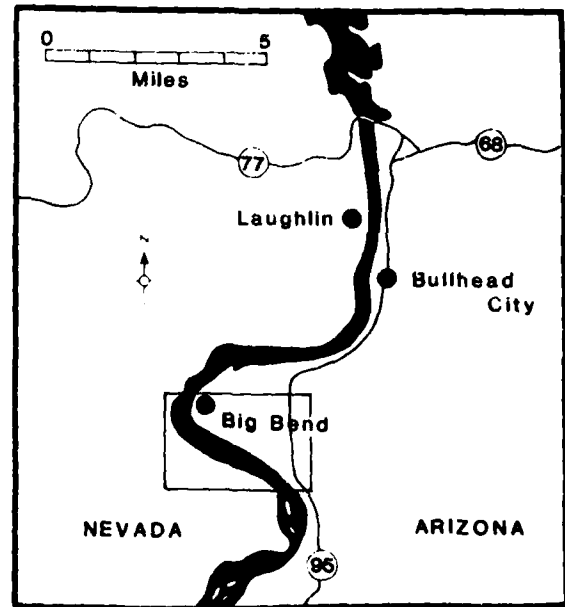
## Warin

NEVADA

56



LOCATION MAP



GP

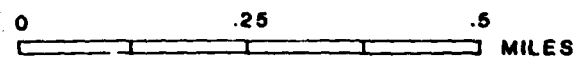
GENERAL PERMIT AREA

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

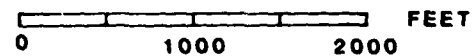
RIVER MILES

214

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)



MILES



FEET



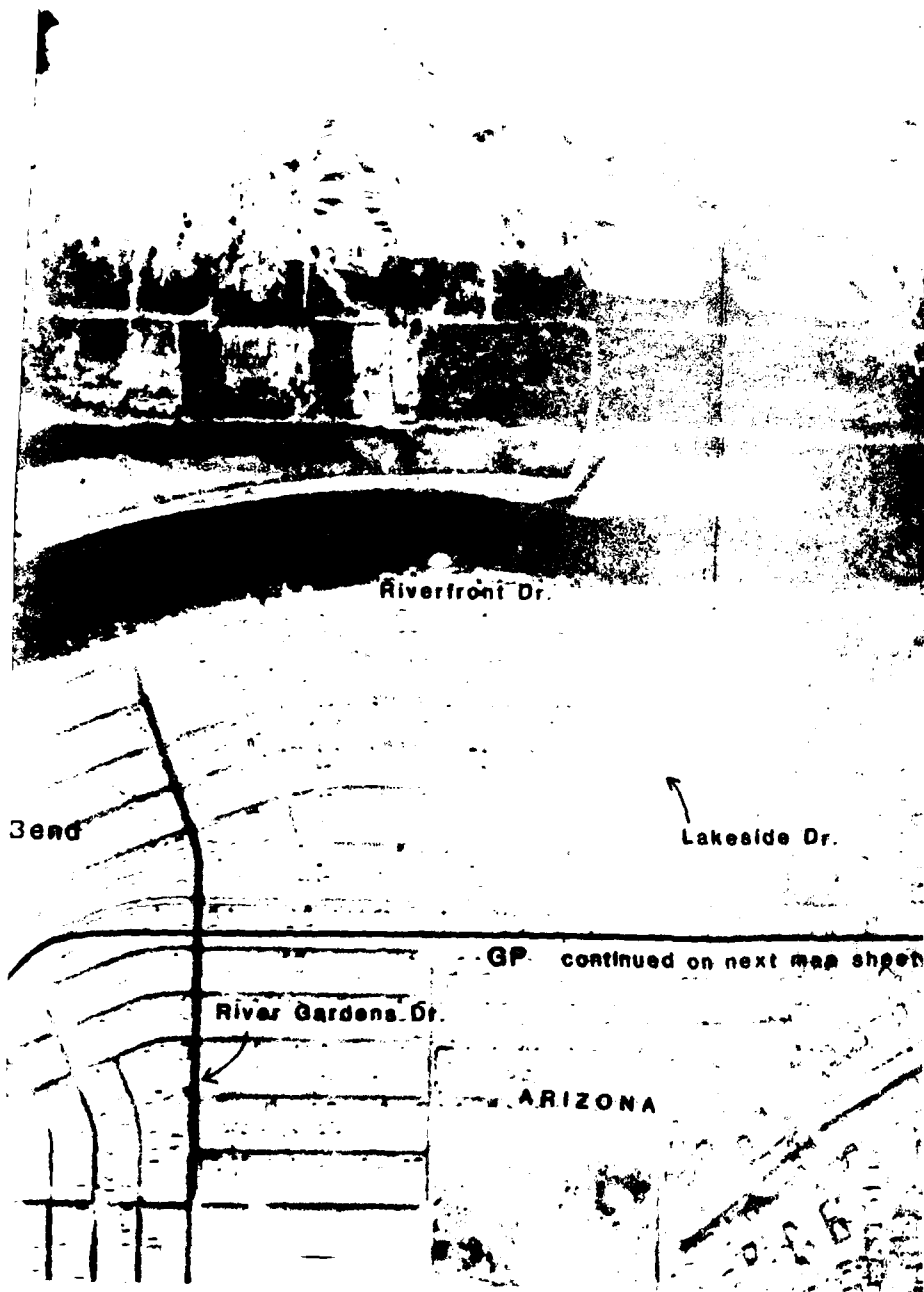
KILOMETERS

PLATE A-9

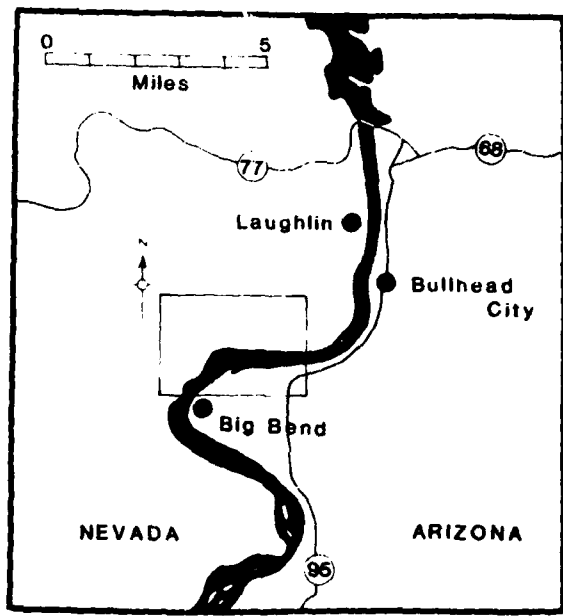
GENERAL PERMIT AREAS

RIVIERA/BIG BEND SOUTH





# LOCATION MAP



## GENERAL PERMIT AREA

GP

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

## RIVER MILES

214

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

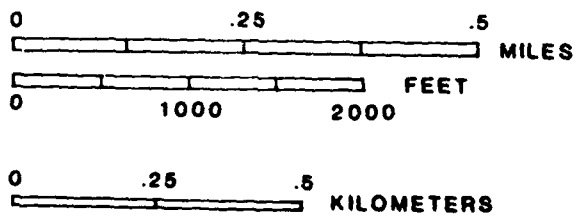


PLATE A-10  
GENERAL PERMIT AREAS  
BIG BEND

2

NEVADA

Silver Creek

270

Robertson Dr

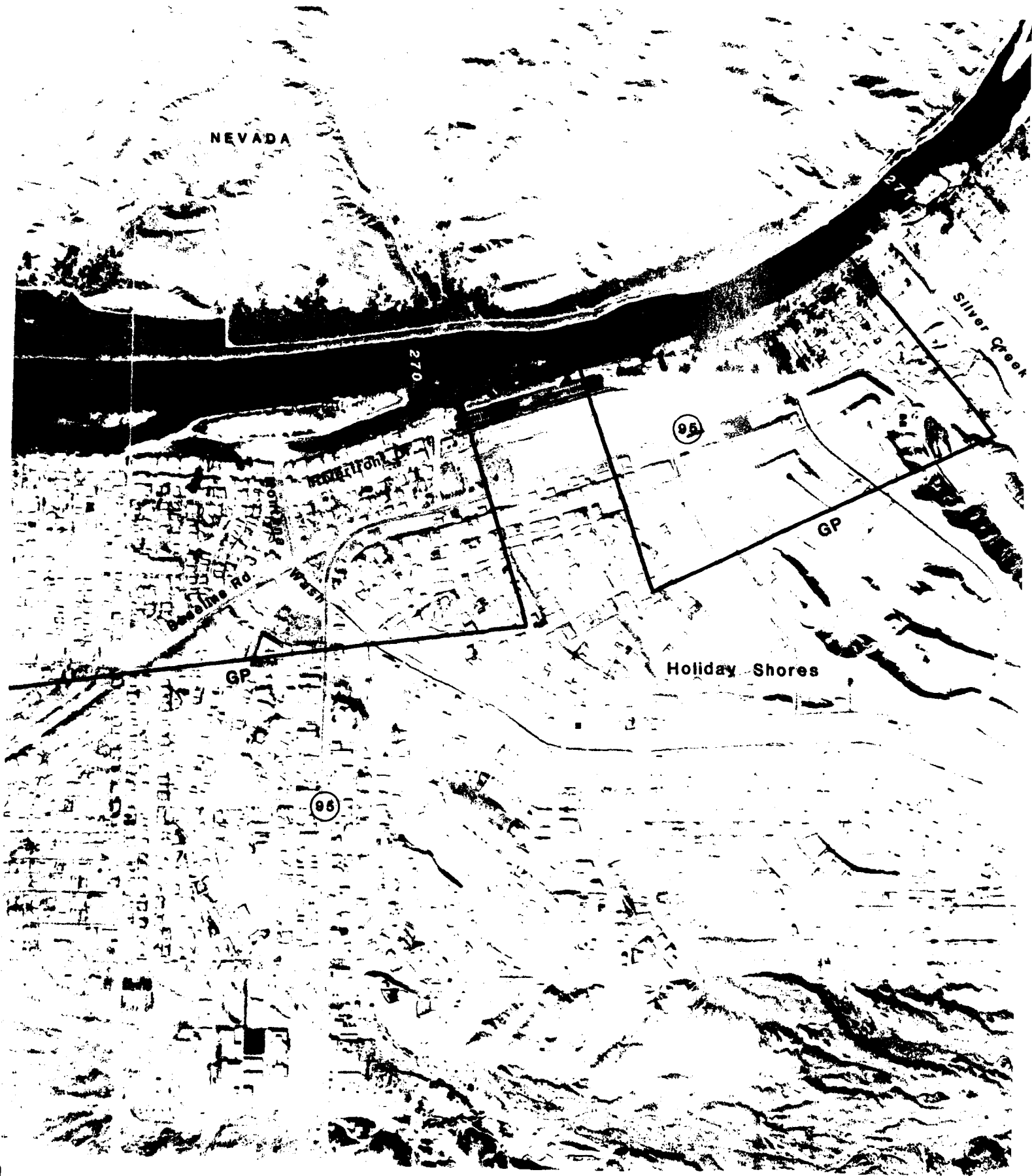
95

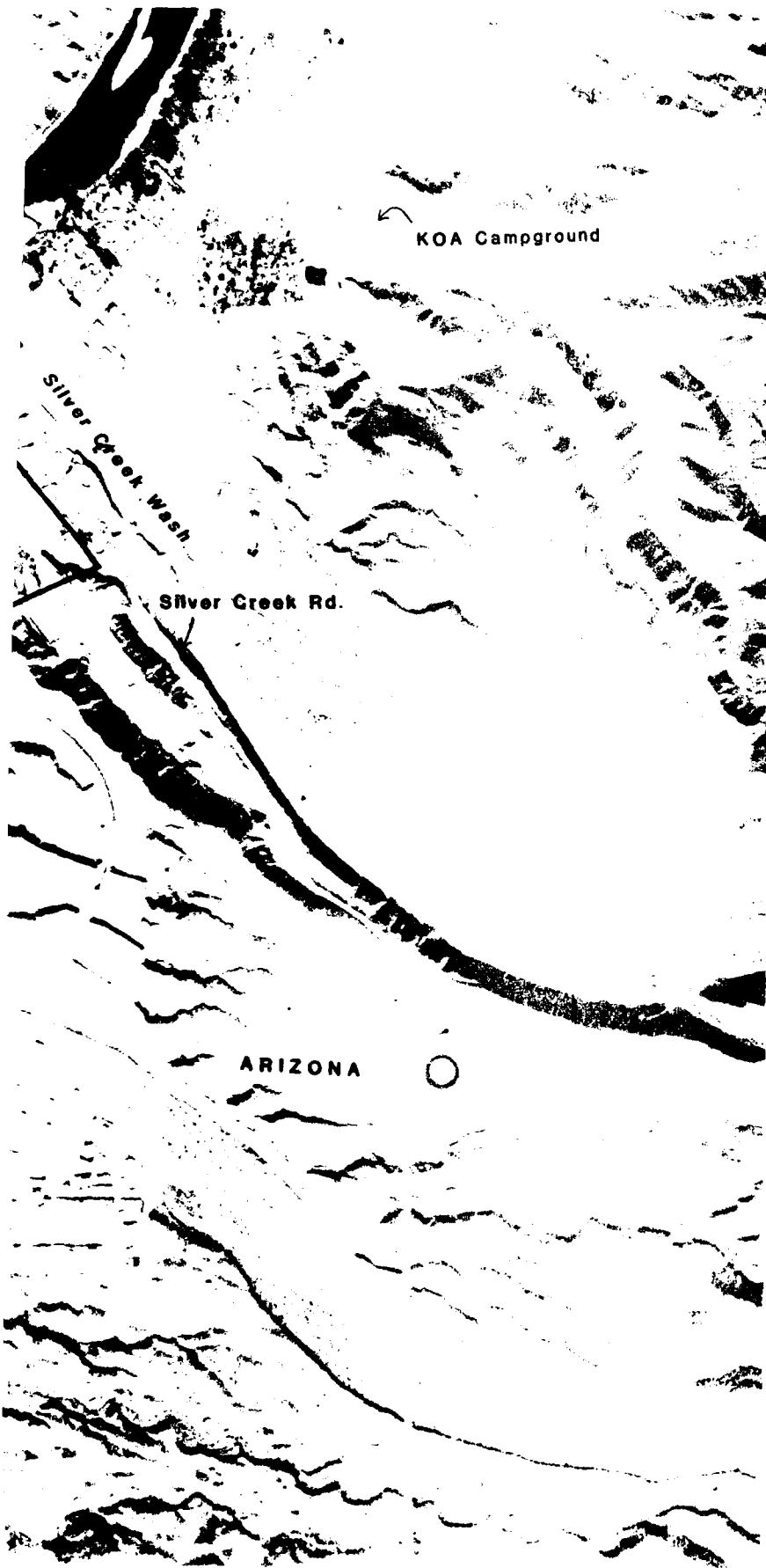
GP

Holiday Shores

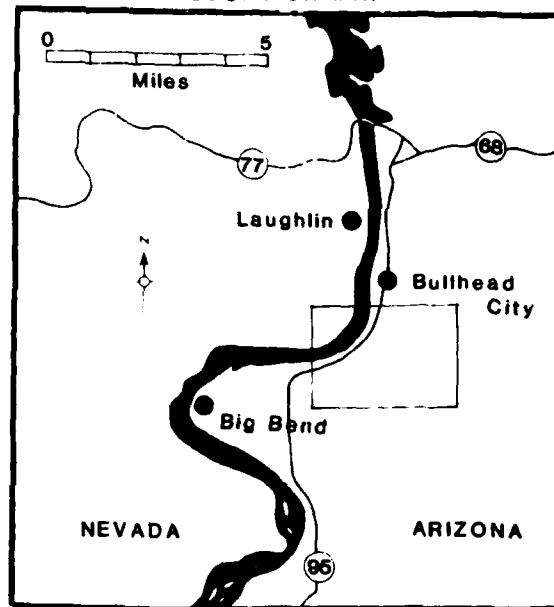
GP

95





# LOCATION MAP



## GENERAL PERMIT AREA

(applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

GP

## RIVER MILES

214

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)

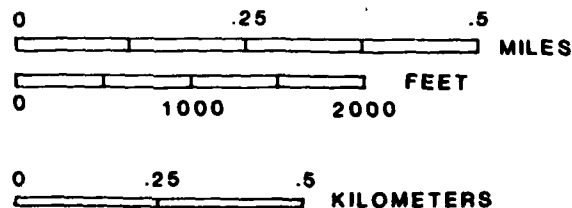
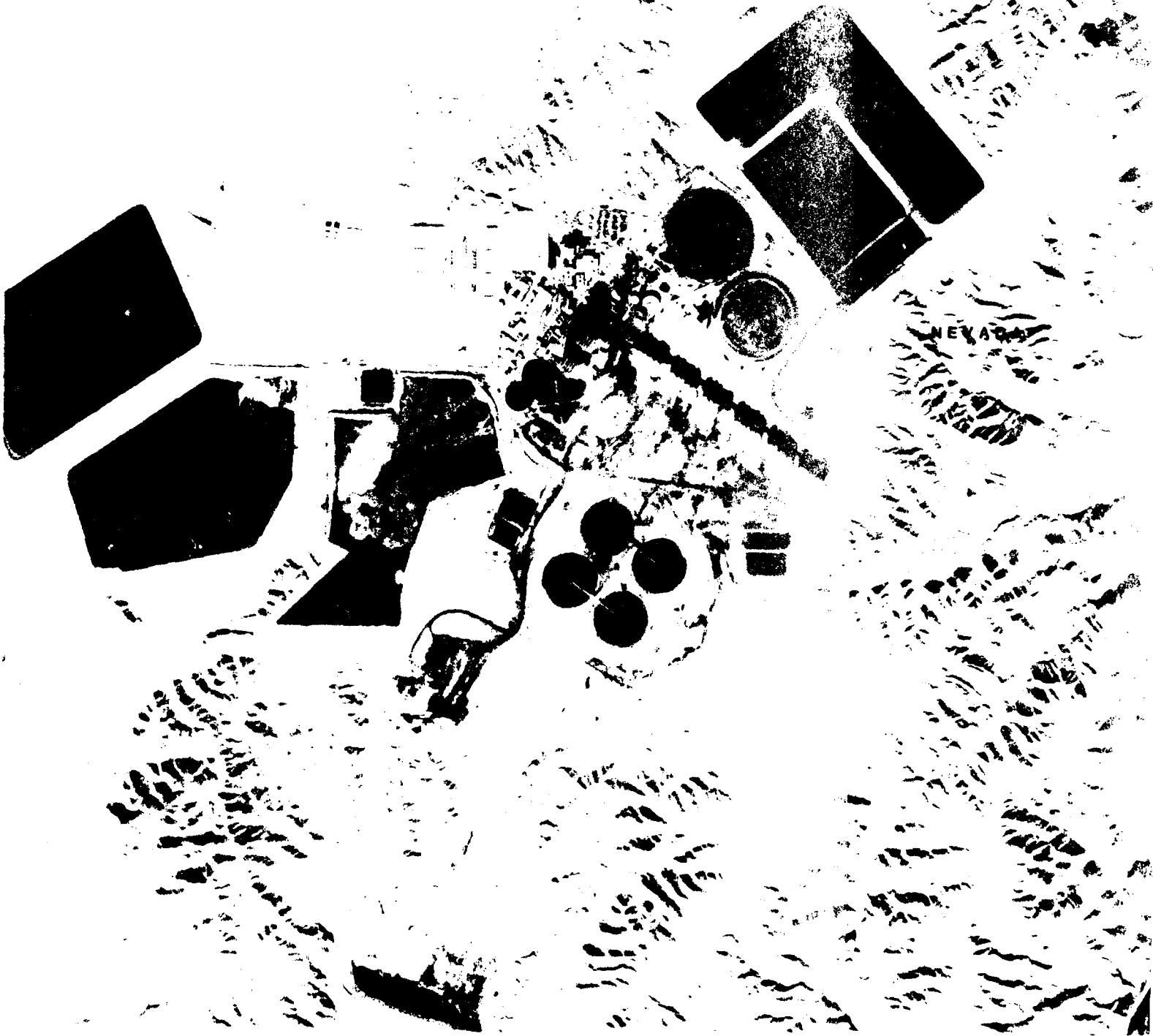


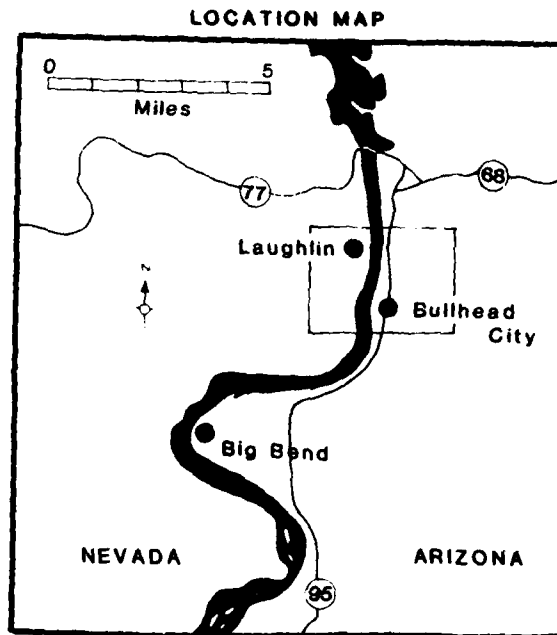
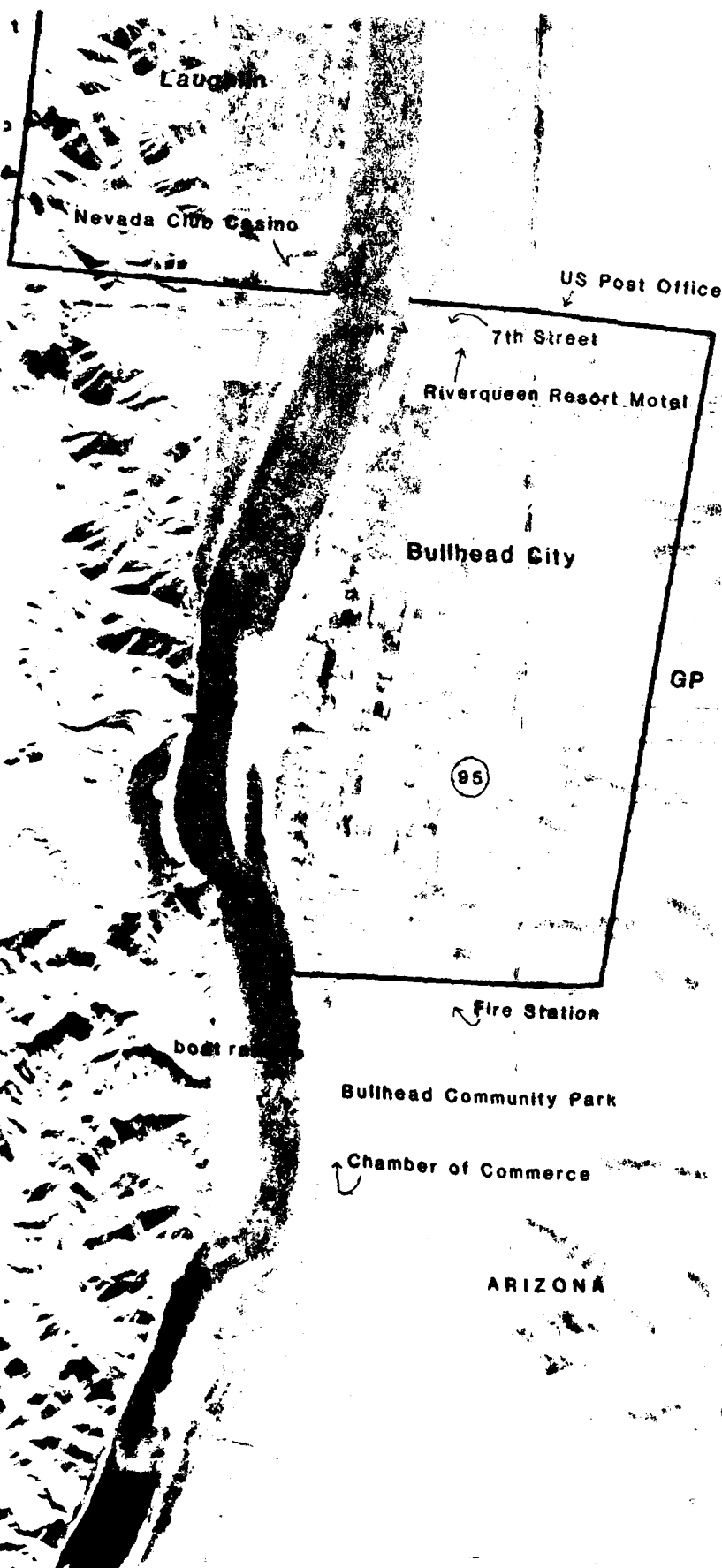
PLATE A-11  
GENERAL PERMIT AREAS  
BIG BEND NORTH/  
HOLIDAY SHORES

continued on next map sheet

GP

Neva





**GENERAL PERMIT AREA**  
 (applies only to shoreline of  
 main channel -- does not apply  
 to islands, tributaries or  
 backwaters)

**RIVER MILES**  
**214**  
 (taken from Pacific Southwest  
 Inter-Agency Committee,  
 River Mile Index, 1976)

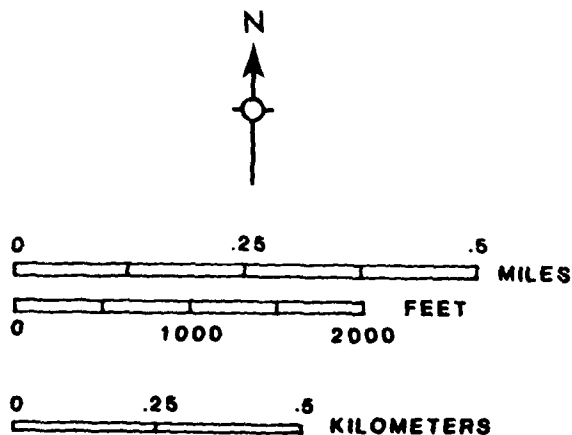


PLATE A-12  
 GENERAL PERMIT AREAS  
 BULLHEAD CITY



NEVADA

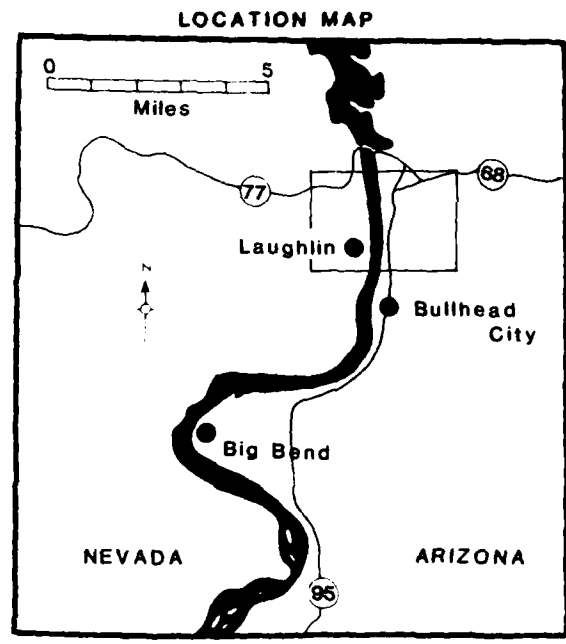
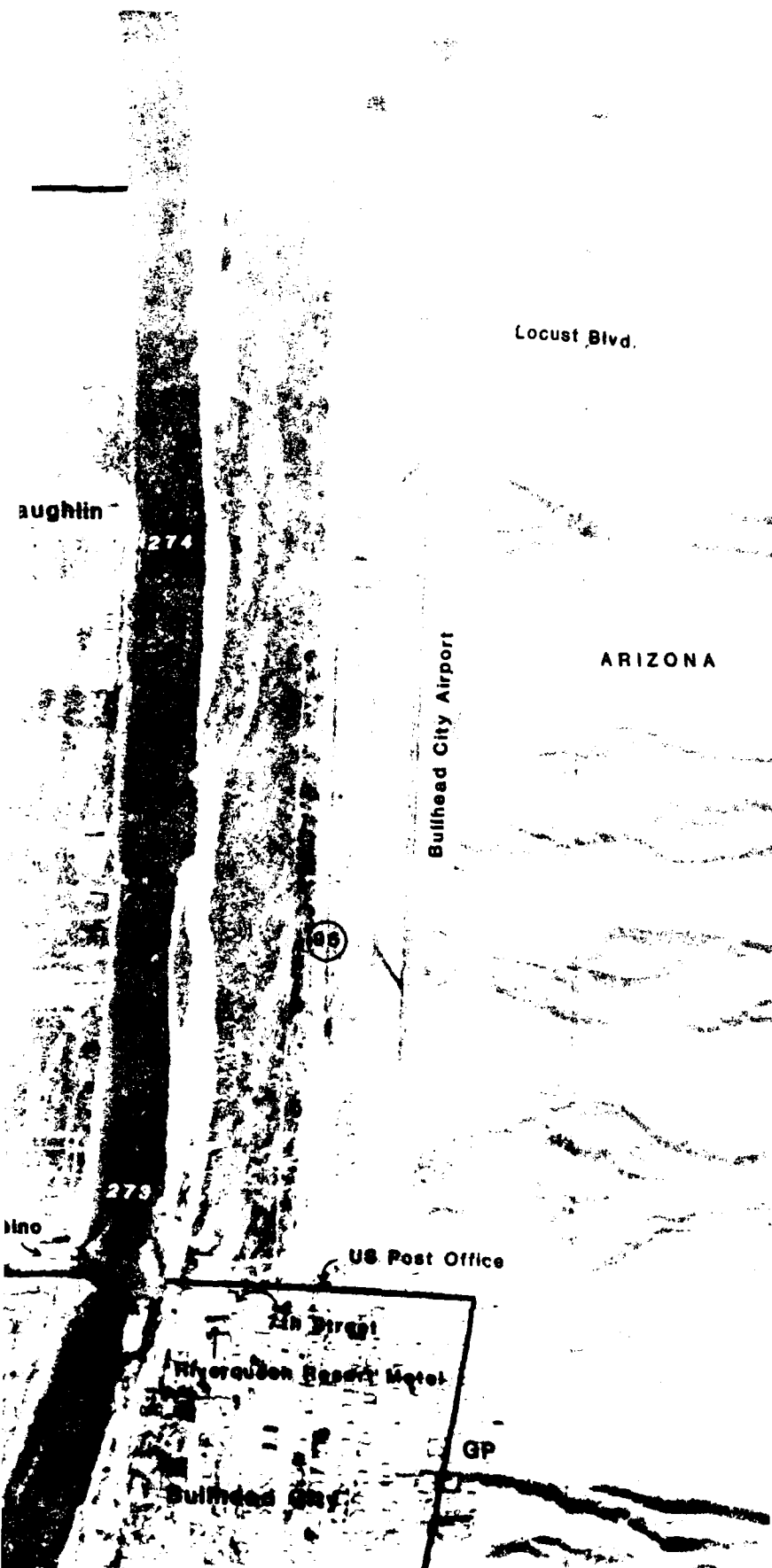
Laughlin

GP

Nevada Club Casino

RI

Bu

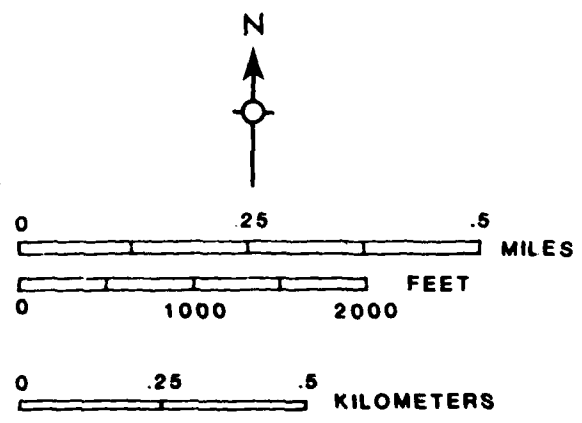


**GENERAL PERMIT AREA**

GP (applies only to shoreline of main channel -- does not apply to islands, tributaries or backwaters)

**214 RIVER MILES**

(taken from Pacific Southwest Inter-Agency Committee, River Mile Index, 1976)



**PLATE A-13**  
**GENERAL PERMIT AREAS**  
**LAUGHLIN**

**APPENDIX B**  
**SPECIES LISTS**

**APPENDIX - B-1 - CHECKLIST OF PLANT SPECIES**

**APPENDIX - B-2 - CHECKLIST OF MAMMALS**

**APPENDIX - B-3 - CHECKLIST OF BIRDS**

**APPENDIX - B-4 - CHECKLIST OF AMPHIBIANS AND REPTILES**

# APPENDIX B-1

## CHECKLIST OF PLANT SPECIES ALONG THE COLORADO RIVER

		<u>Habitat</u>
<b>Ephedraceae</b>		
<u>Ephedra fasciculata</u>	Mormon Tea	DS
<u>Ephedra nevadensis</u>	Mormon Tea	DS
<u>Ephedra torreyana</u>	Mormon Tea	DS
<b>Typhaceae</b>		
<u>Typha angustifolia</u>	Cat-tail	R,M
<b>Poaceae</b>		
<u>Agrostis semiverticillata</u>	Bent Grass	R
<u>Bromus willdenovii</u>	Brome Grass	R
<u>Echinochloa crusgalli</u>	Barnyard Grass	R
<u>Muhlenbergia rigens</u>	Muhlenbergia	DS
<u>Panicum capillare</u>		
var. <u>occidentale</u>	Witch Grass	R
<u>Phragmites australis</u>	Reed	R
<u>Polypogon monspeliensis</u>	Rabbit Food Grass	R
<u>Scleropoa rigida</u>		R
<b>Cyperaceae</b>		
<u>Carex subfusca</u>	Sedge	R
<u>Cladium californicum</u>	Saw Grass	R
<u>Cyperus laevigatus</u>	Umbrella-sedge	M
<u>Heleocharis montevidensis</u>	Spike-rush	R,M
<u>Heleocharis rostellata</u>	Spike-rush	R,M
<u>Scirpus americanus</u>	Bulrush	M
<u>Scirpus californicus</u>	Bulrush	M
<u>Scirpus olneyi</u>	Bulrush	M
<u>Scirpus robustus</u>	Bulrush	M
<b>Juncaceae</b>		
<u>Juncus acutus</u>		
var. <u>sphaerocarpus</u>	Rush	R,M
<u>Juncus bufonius</u>	Rush	R,M
<u>Juncus xiphioides</u>	Rush	R,M
<b>Agavaceae</b>		
<u>Yucca schidigera</u>	Mojave Yucca	DS
<u>Yucca newberryi</u>	Yucca	DS
<b>Saururaceae</b>		
<u>Anemopsis californica</u>	Yerba Mansa	R
<b>Salicaceae</b>		
<u>Populus fremontii</u>	Cottonwood	R
<u>Salix exigua</u>	Coyote Willow	R
<u>Salix goodingii</u>	Gooding Willow	R

Viscaceae		
<u>Phoradendron californicum</u>	Mistletoe	R
Polygonaceae		
<u>Chorizanthe brevicornu</u>	Brittle Spine Flower	DS
<u>Chorizanthe rigida</u>	Rigid Spine Herb	DS
<u>Chorizanthe watsonii</u>	Watson Spine Herb	DS
<u>Eriogonum inflatum</u>	Desert-trumpet	DS
<u>Eriogonum nidularium</u>	Wild-buckwheat	DS
<u>Eriogonum reniforme</u>	Wild-buckwheat	DS
<u>Eriogonum thomasi</u>	Wild-buckwheat	DS
<u>Eriogonum trichopes</u>	Wild-buckwheat	DS
<u>Eriogonum viscidulum</u>	Wild-buckwheat	R
<u>Eriogonum aviculare</u>	Knotweed	R
<u>Polygonum ramosissimum</u>	Knotweed	R
<u>Rumex crispus</u>	Dock	R
Chenopodiaceae		
<u>Atriplex canescens</u>	4-wing Saltbush	DS
<u>Atriplex hymenelytra</u>	Desert Holly	DS
<u>Atriplex lentiformis</u>	Quailbush	R, DS
<u>Atriplex polycarpa</u>	Saltbush	R, DS
<u>Bassia hyssopifolia</u>		R
<u>Chenopodium album</u>	Lambs Quarter	R
<u>Kochia scoparia</u>		R
Amaranthaceae		
<u>Tidestromia lanuginosa</u>	Honeysweet	DS
<u>Tidestromia oblongifolia</u>	Honeysweet	DS
Nyctaginaceae		
<u>Boerhaavia erecta</u>		
var. <u>intermedia</u>	Erect Boerhaavia	DS
<u>Boerhaavia wrightii</u>	Large Bracted Boerhaavia	DS
<u>Mirabilis bigelovii</u>		
var. <u>aspera</u>	Four-o'clock	DS
Caryophyllaceae		
<u>Achrocnichia cooperi</u>	Sand-mat	DS
<u>Spergularia marina</u>	Sand-spurrey	R
<u>Arctomecon californica</u>	Bear Poppy	DS
<u>Eschscholzia glyptosperma</u>	California-poppy	DS
<u>Eschscholzia minutiflora</u>	California-poppy	DS
Brassicaceae		
<u>Draba cuneifolia</u>		
var. <u>integrifolia</u>	Wedge-leaved Draba	DS
<u>Lepidium fremontii</u>	Pepper-grass	DS
<u>Lepidium lasiocarpum</u>	Pepper-grass	DS
<u>Sisymbrium altissimum</u>		DS
<u>Thelypodium lasiophyllum</u>		DS
<u>Wislizenia refracta</u>		R

Resedaceae			
	<u>Oligomeris linifolia</u>	Linear-leaved Cambass	DS
Fabaceae			
	<u>Acacia greggii</u>	Cat-claw	DS
	<u>Astragalus geyeri</u>		
	var. <u>triquestrus</u>	Milkvetch	DS
	<u>Astragalus nyensis</u>	Milkvetch	DS, R
	<u>Astragalus nuttallianus</u>		
	var. <u>imperfectus</u>	Milkvetch	R
	<u>Astragalus praelongus</u>	Milkvetch	DS
	<u>Astragalus preussii</u>	Milkvetch	DS
	<u>Astragalus sabulonum</u>	Milkvetch	DS
	<u>Cassia armata</u>	Senna	DS
	<u>Cassia covessii</u>	Senna	DS
	<u>Cercidium floridum</u>	Paloverde	DS
	<u>Cercidium microphyllum</u>	Paloverde	DS
	<u>Dalea mollis</u>	Silk-Dalea	DS
	<u>Dalea mollissima</u>		DS
	<u>Krameria parvifolia</u>	Ratany	DS
	<u>Lotus tomentellus</u>	Deer-vetch	DS
	<u>Marina parryi</u>		DS
	<u>Melilotus albus</u>	Sweet Clover	R
	<u>Melilotus indicus</u>	Sweet Clover	R
	<u>Prosopis glandulosa torreyana</u>	Mesquite	R
	<u>Prosopis pubescens</u>	Screwbean	R
	<u>Psoralea spinosa</u>	Snaketree	DS
	<u>Erodium texanum</u>	Heron-bill	DS
Zygophyllaceae			
	<u>Larrea tridentata</u>	Creosotebush	DS
	<u>Tribulus terrestris</u>	Puncture vine	DS
Euphorbiaceae			
	<u>Bernardia incana</u>		DS
	<u>Croton californicus</u>		
	var. <u>mohavensis</u>	Croton	DS
	<u>Ditaxis neomexicana</u>	New Mexican Ditaxis	DS
	<u>Euphorbia incisa</u>	Spurge	DS
	<u>Euphorbia parryi</u>	Spurge	DS
	<u>Euphorbia ocellata</u>		
	var. <u>arenicola</u>	Spurge	R, DS
	<u>Euphorbia polycarpa</u>		
	var. <u>hirtella</u>	Spurge	DS
	<u>Tetradlea hallii</u>	Spurge	DS
Vitaceae			
	<u>Vitis arizonica</u>	Grape	R

<b>Malvaceae</b>		
<u>Bemalche rotundifolia</u>	Desert Five-spot	DS
<u>Hibiscus denudatus</u>	Hibiscus	R, DS
<u>Sida leprosa</u> var. <u>hederacea</u>	Alkali-mallow	R, DS
<u>Sphaeralcea ambigua</u>	Globe-mallow	DS
<u>Sphaeralcea angustifolia</u>	Globe-mallow	DS
<b>Tamaricaceae</b>		
<u>Tamarix aphylla</u>	Salt Cedar	R
<u>Tamarix ramosissima</u>	Salt Cedar	R
<u>Tamarix parviflora</u>	Salt Cedar	R
<u>Tamarix chinensis</u>	Salt Cedar	R
<b>Loasaceae</b>		
<u>Echynide urens</u>	Rocknettle	DS
<u>Mentzelia involucrata</u>	Sand Blazing Star	DS
<u>Mentzelia nitens</u>	Venus Blazing Star	DS
<u>Mentzelia pumila</u>	Blazing Star	DS
<u>Mentzelia tricuspidata</u>	Spiny-haired Blazing Star	DS
<u>Mentzelia veatchiana</u>	Blazing Star	DS
<u>Petalonyx parryi</u>	Sandpaper Plant	DS
<u>Petalonyx thurberi</u>	Sandpaper Plant	
<b>Cactaceae</b>		
<u>Ferocactus acanthodes</u>	Barrel Cactus	DS
<u>Mammillaria tetrancistra</u>	Nipple Cactus	DS
<u>Opuntia basilaris</u>		
var. <u>treleasei</u>	Beavertail Cactus	DS
<u>Opuntia bigelovii</u>	Teddybear Cactus	DS
<b>Lythraceae</b>		
<u>Lythrum californicum</u>	Loosestrife	R
<b>Onagraceae</b>		
<u>Camissonia brevipes</u>	Yellow-cups	DS
<u>Camissonia chamaenerioides</u>	Long Capsuled Primrose	DS
<u>Camissonia claviformis</u>	Brown-eyed Primrose	DS
<u>Camissonia multiflora</u>	Frost-stemmed Primrose	DS
<u>Camissonia refracta</u>	Narrow-leaved Primrose	DS
<u>Oenothera caespitosa</u>		
var. <u>marginata</u>	Evening Primrose	DS
<u>Oenothera deltoides</u>	Dune Evening Primrose	DS
<b>Fouquieriaceae</b>		
<u>Fouquieria splendens</u>	Ocotillo	DS
<b>Asclepidaceae</b>		
<u>Asclepias subulata</u>	Milkweed	DS
<u>Sarcostema hirtellum</u>		DS

<b>Hydrophyllaceae</b>		
<u>Nama demissum</u>		DS
<u>Phacelia crenulata</u>	<u>Notch-leaved Phacelia</u>	DS
<u>Phacelia glechomaefolia</u>		DS
<u>Phacelia neglecta</u>		DS
<u>Phacelia palmeri</u>	<u>Palmers Phacelia</u>	DS
<u>Phacelia pulchella</u>		
var. <u>goodingii</u>		DS
<u>Phacelia rotundifolia</u>	<u>Round-leaf Phacelia</u>	DS
<u>Pholistoma auritum</u>		DS
<b>Boraginaceae</b>		
<u>Amsinckia tessellata</u>	<u>Fiddleneck</u>	DS
<u>Cryptantha angustifolia</u>	<u>Narrow-leaved</u>	
	<u>Forget-me-not</u>	DS
<u>Cryptantha maritima</u>	<u>White-haired</u>	
	<u>Forget-me-not</u>	DS
<u>Cryptantha micrantha</u>	<u>Purple-rooted</u>	
	<u>Forget-me-not</u>	DS
<u>Cryptantha muricata</u>	<u>Muricate Forget-me-not</u>	DS
<u>Cryptantha nevadensis</u>	<u>Nevada Forget-me-not</u>	DS
<u>Cryptantha recurvata</u>	<u>Recurved Forget-me-not</u>	DS
<u>Cryptantha curassavicum</u>	<u>Heliotrope</u>	DS
<u>Tiquilia palmeri</u>		DS
<u>Tiquilia plicata</u>		DS
<b>Lamiaceae</b>		
<u>Hyptis emoryi</u>	<u>Desert-lavendar</u>	DS
<b>Solanaceae</b>		
<u>Lycium andersonii</u>	<u>Desert-thorn</u>	DS
<u>Nicotiana glauca</u>	<u>Tree Tobacco</u>	R,DS
<b>Scrophulariaceae</b>		
<u>Antirrhinum filipes</u>	<u>Snapdragon</u>	DS
<u>Mimulus bigelovii</u>	<u>Monkey-flower</u>	DS
<u>Mimulus cardinalis</u>	<u>Monkey-flower</u>	DS
<u>Mohavea breviflora</u>	<u>Small Ghost Flower</u>	DS
<u>Mohavea confertiflora</u>	<u>Ghost Flower</u>	DS
<b>Bignoniaceae</b>		
<u>Chilopsis linearis</u>	<u>Desert-willow</u>	R,DS
<b>Orobanchaceae</b>		
<u>Orobanche cooperi</u>	<u>Broom-rape</u>	DS
<b>Plantaginaceae</b>		
<u>Plantago insularis</u>	<u>Plantain</u>	DS
<b>Campanulaceae</b>		
<u>Nemacladus glanduliferus</u>	<u>Threadflower</u>	DS



Asteraceae

Ambrosia dumosa  
Atrichoseris platyphylla  
Baccharis sarothroides  
Baileya pleniradiata  
Bebbia juncea  
Brickellia desertorum  
Chaenactis carphoclinia  
Chaenactis stevioides  
Conyza canadensis  
Encelia farinosa  
Enceliopsis argophylla  
var. grandiflora  
Eriophyllum lanosum  
Eriophyllum wallacei  
Geraea canescens  
Helianthus annuus  
Hymenoclea salsola  
Lygodesmia exigua  
Monoptilon bellidifolium  
Palafoxia linearis  
Pectis papposa  
Perityle emoryi  
Peucephyllum schottii  
Pluchea purpurascens  
Pluchea sericea  
Psathyrotes ramosissima  
Senecio mohavensis  
Solidago confinis  
Sonchus asper  
Stephanomeria pauciflora  
Trichoptilium incisum  
Xanthium saccharatum

Burrobush DS  
 Gravel-ghost DS  
 Broom Baccharis R  
 Sweetbush DS  
 Desert Brickellia DS  
 Pincushion Flower DS  
 Pincushion Flower DS  
 Horsetweed DS  
 Brittle-bush DS  
 Large Flowered Sun Ray DS  
 Woolly Eriophyllum DS  
 Wallace Eriophyllum DS  
 Desert Gold DS  
 Sunflower DS  
 Cheese-weed DS  
 Egbertia DS  
 Spanish Needle DS  
 Chinch-weed DS  
 Rockdaisy DS  
 Pigmy Cedar DS  
 Marsh Fleabane R,M  
 Arrowweed R,M  
 Turtleback DS  
 Groundsel DS  
 Goldenrod R  
 Sowthistle R  
 Desert-straw DS  
 Yellowhead DS  
 Cocklebur R

R = Riparian  
 DS = Desert Scrub  
 A = Aquatic  
 M = Marsh

# APPENDIX B-2

## CHECKLIST OF MAMMALS ALONG THE COLORADO RIVER

	Habitat
<u>Notiosorex crawfordi</u>	R
<u>Macrotus californicus</u>	R,DS
<u>Myotis yumanensis</u>	R,DS
<u>Myotis velifer</u>	R,DS
<u>Myotis lucifugus</u>	R,DS
<u>Myotis thysanodes</u>	R,DS
<u>Myotis californicus</u>	R,DS
<u>Lasionycteris noctivagans</u>	R
<u>Pipistrellus hesperus</u>	R,DS
<u>Eptesicus fuscus</u>	R,DS
<u>Lasiurus borealis</u>	DS
<u>Plecotus townsendii</u>	R,DS
<u>Plecotus phyllotis</u>	R,DS
<u>Antrozous pallidus</u>	R,DS
<u>Tadarida brasiliensis</u>	R,DS
<u>Tadarida macrotis</u>	R,DS
<u>Sylvilagus audubonii</u>	R,DS
<u>Lepus californicus</u>	R,DS
<u>Ammonospermophilus harrisi</u>	DS
<u>Ammonospermophilus leucurus</u>	DS
<u>Spermophilus variegatus</u>	DS
<u>Spermophilus tereticaudus</u>	DS
<u>Thomomys umbrinus</u>	R,DS
<u>Perognathus longimembris</u>	DS
<u>Perognathus amplus</u>	DS
<u>Perognathus formosus</u>	DS
<u>Perognathus intermedius</u>	DS
<u>Perognathus penicillatus</u>	DS
<u>Dipodomys merriami</u>	DS
<u>Dipodomys deserti</u>	DS
<u>Castor canadensis</u>	A,R
<u>Reithrodontomys megalotis</u>	R,DS
<u>Peromyscus crinitus</u>	DS
<u>Peromyscus eremicus</u>	R,DS
<u>Peromyscus maniculatus</u>	R,DS
<u>Peromyscus boylii</u>	R
<u>Onychomys torridus</u>	DS
<u>Sigmodon hispidus</u>	R
<u>Neotoma albigula</u>	R,DS
<u>Neotoma lepida</u>	R,DS
<u>Mus musculus</u>	R
<u>Erethizon dorsatum</u>	R
<u>Canis latrans</u>	R,DS
<u>Vulpes macrotis</u>	R,DS
Desert Shrew	R
California Leaf-nosed Bat	R,DS
Yuma Myotis	R,DS
Cave Myotis	R,DS
Little Brown Bat	R,DS
Fringed Myotis	R,DS
California Myotis	R,DS
Silver-haired Bat	R
Western Pipistrelle	R,DS
Big Brown Bat	R,DS
Red Bat	DS
Townsend's Big-eared Bat	R,DS
Allen's Big-eared Bat	R,DS
Pallid Bat	R,DS
Brazilian Free-tailed Bat	R,DS
Big Free-tailed Bat	R,DS
Desert Cottontail	R,DS
Black-tailed Jackrabbit	R,DS
Harris' Antelope Squirrel	DS
White-tailed Antelope Squirrel	DS
Rock Squirrel	DS
Round-tailed Antelope Squirrel	DS
Southern Pocket Gopher	R,DS
Little Pocket Mouse	DS
Arizona Pocket Mouse	DS
Long-tailed Pocket Mouse	DS
Rock Pocket Mouse	DS
Desert Pocket Mouse	DS
Merriam's Kangaroo Rat	DS
Desert Kangaroo Rat	DS
Beaver	A,R
Western Harvest Mouse	R,DS
Canyon Mouse	DS
Cactus Mouse	R,DS
Deer Mouse	R,DS
Brush Mouse	R
Southern Grasshopper Mouse	DS
Hispid Cotton Rat	R
White-throated Woodrat	R,DS
Desert Woodrat	R,DS
House Mouse	R
Porcupine	R
Coyote	R,DS
Kit Fox	R,DS

Urocyon cinereoargenteus  
Bassariscus astutus  
Procyon lotor  
Taxidea taxus  
Spilogale gracilis  
Mephitis mephitis  
Lutra canadensis  
Felis concolor  
Lynx rufus  
Equus asinus  
Odocoileus hemionus  
Ovis canadensis

Gray Fox  
 Ringtail  
 Raccoon  
 Badger  
 Western-spotted Skunk  
 Striped Skunk  
 River Otter  
 Mountain Lion  
 Bobcat  
 Feral Burro  
 Mule Deer  
 Mountain Sheep

R,DS  
 R,DS  
 R  
 DS  
 R,DS  
 R  
 A,R  
 R,DS  
 R,DS  
 R,DS  
 R  
 R,DS

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R = Riparian  
 DS = Desert Scrub  
 A = Aquatic  
 M = Marsh

APPENDIX B-3

CHECKLIST OF BIRDS  
ALONG THE COLORADO RIVER

	<u>Habitat</u>
<u>Gavia immer</u>	A
<u>Gavia arctica</u>	A
<u>Gavia stellata</u>	A
<u>Podiceps grisegena</u>	A
<u>Podiceps auritus</u>	A
<u>Podiceps nigricollis</u>	A
<u>Aechmophorus occidentalis</u>	A
<u>Podilymbus podiceps</u>	A,R
<u>Halocyptena microsoma</u>	A
<u>Pelecanus erythrorhynchos</u>	A,R
<u>Pelecanus occidentalis</u>	A
<u>Sula nebouxii</u>	A
<u>Sula leucogaster</u>	A
<u>Phalacrocorax auritus</u>	A,R
<u>Fregata magnificens</u>	A
<u>Ardea herodias</u>	R
<u>Butorides striatus</u>	R
<u>Florida caerulea</u>	R
<u>Butorides striatus</u>	R
<u>Bubulcus ibis</u>	R
<u>Casmerodius albus</u>	R
<u>Egretta thula</u>	R
<u>Hydranassa tricolor</u>	R
<u>Nycticorax nycticorax</u>	R
<u>Ixobrychus exilis</u>	R
<u>Botaurus lentiginosus</u>	R
<u>Mycteria americana</u>	R
<u>Plegadis chihi</u>	R
<u>Ajaja ajaja</u>	R
<u>Olor columbianus</u>	A,R
<u>Branta canadensis</u>	A,R
<u>Branta bernicla</u>	A,R
<u>Anser albifrons</u>	A,R
<u>Chen caerulescens</u>	A,R
<u>Chen rossii</u>	R
<u>Anas platyrhynchos</u>	A,R
<u>Anas strepera</u>	R
<u>Anas acuta</u>	A,R
<u>Anas crecca</u>	A,R
<u>Anas discors</u>	A,R
<u>Anas cyanoptera</u>	A,R
<u>Anas penelope</u>	A,R
<u>Anas americana</u>	A,R
<u>Anas clypeata</u>	A,R
<u>Aix sponsa</u>	R
Common Loon	A
Artic Loon	A
Red-throated Loon	A
Red-necked Grebe	A
Horned Grebe	A
Eared Grebe	A
Western Grebe	A
Pied-billed Grebe	A,R
Least Petrel	A
White Pelican	A,R
Brown Pelican	A
Blue-footed Booby	A
Brown Booby	A
Double-crested Cormorant	A,R
Magnificent Frigatebird	A
Great Blue Heron	R
Green Heron	R
Little Blue Heron	R
Cattle Egret	R
Common Egret	R
Snowy Egret	R
Louisiana Heron	R
Black-crowned Night Heron	R
Least Bittern	R
American Bittern	R
Wood Stork	R
White-faced Ibis	R
Roseate Spoonbill	R
Whistling Swan	A,R
Canada Goose	A,R
Black Brant	A,R
White-fronted Goose	A,R
Snow Goose	A,R
Ross' Goose	R
Mallard	A,R
Gadwall	R
Pintail	A,R
Green-winged Teal	A,R
Blue-winged Teal	A,R
Cinnamon Teal	A,R
European Wigeon	A,R
American Wigeon	A,R
Northern Shoveler	A,R
Wood Duck	R

Aythya americana  
Aythya collaris  
Aythya valisineria  
Aythya marila  
Aythya affinis  
Bucephala clangula  
Bucephala islandica  
Bucephala albeola  
Clangula hyemalis  
Melanitta deglandi  
Melanitta perspicillata  
Oxyura jamaicensis  
Lophodytes cucullatus  
Mergus merganser  
Mergus serrator  
Cathartes aura  
Accipiter gentilis  
Accipiter striatus  
Accipiter cooperii  
Buteo jamaicensis  
Buteo swainsoni  
Buteo lagopus  
Buteo regalis  
Parabuteo unicinctus  
Aquila chrysaetos  
Haliaeetus leucocephalus  
Circus cyaneus  
Pandion haliaetus  
Falco mexicanus  
Falco peregrinus  
Falco columbarius  
Falco sparverius  
Lophortyx gambelli  
Phasianus colchicus  
Alectoris chukar  
Meleagris gallopavo  
Grus canadensis  
Rallus limicola  
Rallus longirostris yumanensis  
Leterallus jamaicensis  
coturniculus  
Porzana carolina  
Gallinula chloropus  
Fulica americana  
Charadrius semipalmatus  
Charadrius alexandrinus  
Charadrius vociferus  
Charadrius montanus  
Phaethon dominicus  
Phaethon squatarola  
Arenaria interpres  
Capella gallinago

Redhead	A
Rig-necked Duck	A
Canvasback	A
Greater Scaup	A
Lesser Scaup	A
Common Goldeneye	A
Barrows Goldeneye	A
Bufflehead	A
Oldsquaw	A
White-winged Scoter	A
Surf Scoter	A
Ruddy Duck	A,R
Hooded Merganser	A,R
Common Merganser	A
Red-breasted Merganser	A
Turkey Vulture	R,DS
Coohawk	DS
Sharp-skinned Hawk	R,DS
Cooper's Hawk	R,DS
Red-tailed Hawk	R,DS
Swainson's Hawk	R,DS
Rough-legged Hawk	R,DS
Ferruginous Hawk	R,DS
Harris Hawk	R,DS
Golden Eagle	R,DS
Bald Eagle	R
Marsh Hawk	R,DS
Osprey	R,DS
Prairie Falcon	R,DS
Peregrine Falcon	R,DS
Merlin	A
American Kestrel	R,DS
Gambel's Quail	R,DS
Ring-necked Pheasant	R
Chukar	R,DS
Turkey	R
Sandhill Crane	R
Virginia Rail	R
Yuma Clapper Rail	R
California Black Rail	R
Sora	R
Common Gallinule	A,R
American Coot	A,R
Semipalmated Plover	R
Snowy Plover	R
Killdeer	R
Mountain Plover	R
American Golden Plover	R
Black-bellied Plover	R
Ruddy Turnstone	R
Common Snipe	R

Numenius americanus  
Numenius phaeopus  
Bartramia longicauda  
Actitis macularia  
Tringa solitaria  
Tringa totanus  
Tringa melanoleucas  
Tringa falpupes  
Catoptrophorus semipalmatus  
Calidris canutus  
Calidris melanotos  
Calidris bairdii  
Calidris minutilla  
Calidris alpina  
Calidris pusillus  
Calidris mauri  
Calidris alba  
Limnodromus griseus  
Limnodromus scolopaceus  
Micropalama himantopus  
Limosa fedoa  
Limosa haemastica  
Recurvirostra americana  
Himantopus mexicanus  
Phalaropus fulicarius  
Steganopus tricolor  
Lobipes lobatus  
Stercorarius parasiticus  
Larus hyperboreus  
Larus glaucescens  
Larus argentatus  
Larus thayeri  
Larus californicus  
Larus delawarensis  
Larus canus  
Larus pipixcan  
Larus philadelphia  
Larus heermanni  
Rissa tridactyla  
Xema sabini  
Sterna forsteri  
Sterna hirundo  
Sterna albifrons  
Sterna caspia  
Chileonias niger  
Synthliboramphus antiquus  
Columba fasciata  
Zenaidura macroura  
Columbina passerina  
Scardafella inca  
Coccyzus americanus

Long-billed Curlew	R
Whimbrel	R
Upland Plover	R
Spotted Sandpiper	R
Solitary Sandpiper	R
Redshank	R
Greater Yellowlegs	R
Lesser Yellowlegs	R
Willet	R
Red Knot	R
Pectoral Sandpiper	R
Baird's Sandpiper	R
Least Sandpiper	R
Dunlin	R
Semipalmated Sandpiper	R
Western Sandpiper	R
Sanderling	R
Short-billed Dowitcher	R
Long-billed Dowitcher	R
Stilt Sandpiper	R
Marbled Godwit	R
Hudsonian Godwit	R
American Avocet	A,R
Black-necked Stilt	R
Red Phalarope	A,R
Wilson's Phalarope	A,R
Northern Phalarope	A,R
Parasitic Jaeger	A,R
Glaucous Gull	A
Glaucous-winged Gull	A
Herring Gull	A,R
Thayer's Gull	A,R
California Gull	A,R
Ring-billed Gull	A,R
Mew Gull	A
Franklin's Gull	A,R
Bonaparte's Gull	A,R
Hermann's Gull	A
Black-legged Kittiwake	A
Sabine's Gull	A,R
Forster's Tern	A,R
Common Tern	A,R
Least Tern	A,R
Caspian Tern	A,R
Black Tern	A,R
Ancient Murrelet	A
Band-tailed Pigeon	DS
White-winged Dove	R,DS
Mourning Dove	R,DS
Ground Dove	R
Inca Dove	O
Yellow-billed Cuckoo	R

<u>Geococcyx californianus</u>	Roadrunner	R,DS
<u>Crotophaga sulcirostris</u>	Groove-billed Ani	R
<u>Tyto alba</u>	Barn Owl	R,DS
<u>Otus asio</u>	Screech Owl	R,DS
<u>Bubo virginianus</u>	Great Horned Owl	R,DS
<u>Nyctea scandiaca</u>	Snowy Owl	O
<u>Micrathene whitneyi</u>	Elf Owl	R
<u>Speotyto cunicularia</u>	Burrowing Owl	R,DS
<u>Asio otus</u>	Long-eared Owl	R,DS
<u>Asio flammeus</u>	Short-eared Owl	R
<u>Phalaenoptilus nuttallii</u>	Poor-will	R,DS
<u>Chordeiles minor</u>	Common Nighthawk	R,DS
<u>Chordeiles acutipennis</u>	Lesser Nighthawk	R,DS
<u>Chaetura vauxi</u>	Vaux's Swift	R,DS
<u>Aeronautes saxatalis</u>	White-throated Swift	R,DS
<u>Archilochus alexandri</u>	Black-chinned Hummingbird	R
<u>Calypte costae</u>	Costa's Hummingbird	R,DS
<u>Selasphorus platycercus</u>	Broad-tailed Hummingbird	R,DS
<u>Selasphorus rufus</u>	Rufous Hummingbird	R,DS
<u>Stellula calliope</u>	Calliope Hummingbird	R
<u>Megasceryle alcyon</u>	Belted Kingfisher	R
<u>Colaptes auratus</u>	Common Flicker	R,DS
<u>Melanerpes uropygialis</u>	Gila Woodpecker	R,DS
<u>Melanerpes formicivorus</u>	Acorn Woodpecker	DS
<u>Melanerpes lewis</u>	Lewis' Woodpecker	R
<u>Sphyrapicus varius</u>	Yellow-bellied Sapsucker	R
<u>Sphyrapicus thyroideus</u>	Williamson's Sapsucker	R
<u>Picoides villosus</u>	Hairy Woodpecker	R
<u>Picoides pubescens</u>	Downy Woodpecker	O
<u>Picoides scalaris</u>	Ladder-backed Woodpecker	R,DS
<u>Tyrannus tyrannus</u>	Eastern Kingbird	R
<u>Tyrannus verticalis</u>	Western Kingbird	R,DS
<u>Tyrannus vociferans</u>	Cassin's Kingbird	R,DS
<u>Muscivora forficata</u>	Scissor-tailed Flycatcher	R
<u>Myiarchus tyrannulus</u>	Wied's Crested Flycatcher	R
<u>Myiarchus cinerascens</u>	Ash-throated Flycatcher	R,DS
<u>Sayornis nigricans</u>	Black Phoebe	R,DS
<u>Sayornis saya</u>	Say's Phoebe	R,DS
<u>Empidonax traillii</u>	Willow Flycatcher	R
<u>Empidonax minimus</u>	Least Flycatcher	R
<u>Empidonax hammondi</u>	Hammond's Flycatcher	R
<u>Empidonax oberholseri</u>	Dusky Flycatcher	R
<u>Empidonax wrightii</u>	Gray Flycatcher	R,DS
<u>Empidonax difficilis</u>	Western Flycatcher	R
<u>Contopus sordidulus</u>	Western Wood Pewee	R,DS
<u>Nuttallornis borealis</u>	Olive-sided Flycatcher	R
<u>Pyrocephalus rubinus</u>	Vermilion Flycatcher	R,DS
<u>Eremophila alpestris</u>	Horned Lark	R,DS
<u>Tachycineta thalassina</u>	Violet-green Swallow	R,DS
<u>Iridoprocne bicolor</u>	Tree Swallow	R,DS
<u>Riparia riparia</u>	Bank Swallow	R
<u>Stelgidopteryx ruficollis</u>	Rough-winged Swallow	R,DS

<u>Hirundo rustica</u>	Barn Swallow	R,DS
<u>Petrochelidon pyrrhonota</u>	Cliff Swallow	R,DS
<u>Progne subis</u>	Purple Martin	R
<u>Cyanocitta stelleri</u>	Steller's Jay	R
<u>Aphelocoma coerulescens</u>	Scrub Jay	R,DS
<u>Pica pica</u>	Black-billed Magpie	R
<u>Corvus corax</u>	Common Raven	R,DS
<u>Corvus brachyrhynchos</u>	Common Crow	R,DS
<u>Gymnorhinus cyanocephalus</u>	Pinyon Jay	R,DS
<u>Neelfraga columbiana</u>	Clark's Nutcracker	R
<u>Parus gambeli</u>	Mountain Chickadee	R,DS
<u>Auriparus flaviceps</u>	Verdin	R,DS
<u>Psatriparus minimus</u>	Common Bushtit	R,DS
<u>Sitta carolinensis</u>	White-breasted Nuthatch	R
<u>Sitta canadensis</u>	Red-breasted Nuthatch	R
<u>Certhia familiaris</u>	Brown Creeper	R
<u>Cinclus mexicanus</u>	Dipper	R
<u>Troglodytes aedon</u>	House Wren	R,DS
<u>Troglodytes troglodytes</u>	Winter Wren	R
<u>Thryomanes bewickii</u>	Bewick's Wren	R,DS
<u>Campylorhynchus brunneicapillus</u>	Cactus Wren	R,DS
<u>Clatohorus palustris</u>	Long-billed Marsh Wren	R
<u>Catherpes mexicanus</u>	Canyon Wren	R,DS
<u>Salpinctes obsoletus</u>	Rock Wren	R,DS
<u>Mimus polyglottus</u>	Mockingbird	R,DS
<u>Dumetella carolinensis</u>	Catbird	O
<u>Toxostoma rufum</u>	Brown Thrasher	R
<u>Toxostoma bendirei</u>	Bendire's Thrasher	R,DS
<u>Toxostoma curvirostre</u>	Curve-billed Thrasher	R
<u>Toxostoma lecontei</u>	Le Conte's Thrasher	R,DS
<u>Toxostoma dorsale</u>	Crissal Thrasher	R,DS
<u>Oreoscoptes montanus</u>	Sage Thrasher	R,DS
<u>Turdus migratorius</u>	American Robin	R,DS
<u>Ixoreus naevius</u>	Varied Thrush	R
<u>Catharus guttatus</u>	Hermit Thrush	R,DS
<u>Catharus ustulatus</u>	Swainson's Thrush	R
<u>Sialia mexicana</u>	Western Bluebird	R,DS
<u>Sialia currucoides</u>	Mountain Bluebird	R,DS
<u>Myadestes townsendii</u>	Townsend's Solitaire	R,DS
<u>Polioptila caerulea</u>	Blue-gray Gnatcatcher	R,DS
<u>Polioptila melanura</u>	Black-tailed Gnatcatcher	R,DS
<u>Regulus satrapa</u>	Golden-crowned Kinglet	R
<u>Regulus calendula</u>	Ruby-crowned Kinglet	R,DS
<u>Anthus spinoletta</u>	Water Pipit	R,DS
<u>Bombycilla garrulus</u>	Bohemian Waxwing	R,DS
<u>Bombycilla cedrorum</u>	Cedar Waxwing	R,DS
<u>Phainopepla nitens</u>	Phainopepla	R,DS
<u>Lanius excubitor</u>	Northern Shrike	R
<u>Lanius ludovicianus</u>	Loggerhead Shrike	R,DS
<u>Sturnus vulgaris</u>	Starling	R,DS
<u>Vireo huttoni</u>	Hutton's Vireo	R
<u>Vireo bellii</u>	Bell's Vireo	R



<u>Vireo vicinior</u>	Gray Vireo	R
<u>Vireo solitarius</u>	Solitary Vireo	R, DS
<u>Vireo olivaceus</u>	Red-eyed Vireo	R
<u>Vireo gilvus</u>	Warbling Vireo	R, DS
<u>Mniotilta varia</u>	Black-and-white Warbler	R
<u>Protonotaria citrea</u>	Prothonotory Warbler	R
<u>Vermivora peregrina</u>	Tennessee Warbler	R
<u>Vermivora celata</u>	Orange-crowned Warbler	R, DS
<u>Vermivora ruficapilla</u>	Nashville Warbler	R
<u>Vermivora virginiae</u>	Virginia's Warbler	R
<u>Vermivora luciae</u>	Lucy's Warbler	R, DS
<u>Dendroica petechia</u>	Yellow Warbler	R
<u>Dendroica magnolia</u>	Magnolia Warbler	R
<u>Dendroica carulescens</u>	Black-throated Blue Warbler	R
<u>Dendroica coronata</u>	Yellow-rumped Warbler	R, DS
<u>Dendroica nigrescens</u>	Black-throated Gray Warbler	R, DS
<u>Dendroica townsendi</u>	Townsend's Warbler	R, DS
<u>Dendroica occidentalis</u>	Hermit Warbler	R
<u>Dendroica cerulea</u>	Cerulean Warbler	R
<u>Dendroica graciae</u>	Grace's Warbler	R
<u>Dendroica pennsylvanica</u>	Chestnut-sided Warbler	R
<u>Dendroica palmarum</u>	Palm Warbler	R
<u>Seiurus aurocapillus</u>	Ovenbird	O
<u>Seiurus noveboracensis</u>	Northern Waterthrush	R
<u>Oporornis tolmiei</u>	MacGillivray's Warbler	R, DS
<u>Geothlypis trichas</u>	Yellowthroat	R
<u>Icteria virens</u>	Yellow-breasted Chat	R
<u>Wilsonia citrina</u>	Hooded Warbler	R
<u>Wilsonia pusilla</u>	Wilson's Warbler	R, DS
<u>Wilsonia canadensis</u>	Canada Warbler	R
<u>Setophaga ruticilla</u>	American Redstart	R, DS
<u>Myioborus picta</u>	Painted Redstart	R
<u>Passer domesticus</u>	House Sparrow	R
<u>Dolichonyx oryzivorus</u>	Bobolink	R
<u>Sturnella neglecta</u>	Western Meadowlark	R, DS
<u>Xanthocephalus xanthocephalus</u>	Yellow-headed Blackbird	R
<u>Agelaius phoeniceus</u>	Red-winged Blackbird	R
<u>Icterus cucullatus</u>	Hooded Oriole	R
<u>Icterus parisorum</u>	Scott's Oriole	R, DS
<u>Icterus galbula</u>	Northern Oriole	R
<u>Euphagus cyanocephalus</u>	Brewer's Blackbird	R
<u>Quiscalus mexicanus</u>	Great-tailed Grackle	R
<u>Molothrus ater</u>	Brown-headed Cowbird	R, DS
<u>Piranga ludoviciana</u>	Western Tanager	R, DS
<u>Piranga rubra</u>	Summer Tanager	R
<u>Cardinalis cardinalis</u>	Cardinal	R
<u>Pheucticus ludovicianus</u>	Rose-breasted Grosbeak	R
<u>Pheucticus melanocephalus</u>	Black-headed Grosbeak	R, DS
<u>Guiraca caerulea</u>	Blue Grosbeak	R
<u>Passerina cyanea</u>	Indigo Bunting	R
<u>Passerina amoena</u>	Lawdi Bunting	R
<u>Passerina ciris</u>	Painted Bunting	R

Spiza americana  
Hesperiphona vespertina  
Carpodacus cassinii  
Carpodacus mexicanus  
Carduelis pinus  
Carduelis tristis  
Carduelis psaltria  
Carduelis lawrencei  
Loxia curvirostra  
Pipilo chlorura  
Pipilo erythrophthalmus  
Pipilo fuscus  
Pipilo aberti  
Calamospiza melanocorys  
Passerculus sandwichensis  
Ammodramus savannarum  
Poocetes gramineus  
Chondestes grammacus  
Amphispiza ruficeps  
Amphispiza bilineata  
Amphispiza belli  
Junco hyemalis  
Junco caniceps  
Spizella arborea  
Spizella passerina  
Spizella breweri  
Spizella atrogularis  
Zonotrichia querula  
Zonotrichia leucophrys  
Zonotrichia atricapilla  
Zonotrichia albicollis  
Passerella iliaca  
Melospiza lincolni  
Melospiza georgiana  
Melospiza melodia  
Calcarius ornatus  
Calcarius lapponicus

Dickcissel	R
Evening Grosbeak	R
Cassin's Finch	R
House Finch	R,DS
Pine Siskin	
American Goldfinch	R
Lesser Goldfinch	R,DS
Lawrence's Goldfinch	O
Red Crossbill	R
Green-tailed Towhee	R,DS
Rufous-sided Towhee	R,DS
Brown Towhee	R
Albert's Towhee	R
Lark Bunting	R,DS
Savannah Sparrow	R,DS
Grasshopper Sparrow	R
Vesper Sparrow	R
Lark Sparrow	R
Rufous-crowned Sparrow	R,DS
Black-throated Sparrow	R,DS
Sage Sparrow	R,DS
Dark-eyed Sparrow	
Gray-headed Junco	
Tree Sparrow	R
Chipping Sparrow	R,DS
Brewer's Sparrow	R,DS
Black-chinned Sparrow	DS
Harris' Sparrow	R
White-crowned Sparrow	R,DS
Golden-crowned Sparrow	R
White-throated Sparrow	R
Fox Sparrow	R
Lincoln's Sparrow	R,DS
Swamp Sparrow	R
Song Sparrow	R
Chestnut-collared Longspur	R
Lapland Longspur	R

# APPENDIX B-4

## CHECKLIST OF AMPHIBIANS AND REPTILES ALONG THE COLORADO RIVER

		<u>Habitat</u>
<u>Ambystoma tigrinum</u>	Tiger Salamander	A,R
<u>Scaphiopus couchi</u>	Couch Spadefoot Toad	DS
<u>Scaphiopus hammondi</u>	Western Spadefoot Toad	DS
<u>Bufo alvarius</u>	Colorado River Toad	R
<u>Bufo cognatus</u>	Great Plains Toad	R
<u>Bufo microscaphus</u>	Southwestern Toad	R
<u>Bufo punctatus</u>	Desert Toad	R
<u>Bufo woodhousei</u>	Woodhouse's Toad	R
<u>Hyla arenicolor</u>	Canyon Tree Frog	R
<u>Hyla regilla</u>	Pacific Tree Frog	R
<u>Hyla wrightorum</u>	Arizona Tree Frog	R
<u>Rana catesbeiana</u>	Bullfrog	A,R
<u>Rana onca</u>		R
<u>Rana pipiens</u>	Leopard Frog	A,R
<u>Gopherus agassizi</u>	Desert Tortoise	DS
<u>Kinosternon flavescens</u>	Yellow Mud Turtle	A
<u>Kinosternon sonoriense</u>	Sonoran Mud Turtle	A
<u>Trionyx spiniferus</u>	Spiny Soft-shelled Turtle	A
<u>Phyllodactylus xanti</u>	Leaf-toed Gecko	DS
<u>Coleonyx variegatus</u>	Western Banded Gecko	DS
<u>Dipsosaurus dorsalis</u>	Desert Crested Lizard	DS
<u>Sauromalus obesus</u>	Chuckwalla	DS
<u>Callisaurus draconoides</u>	Zebra-tailed Lizard	DS
<u>Uma notata</u>	Colorado Desert Fringe-toed Lizard	DS
<u>Uma scoparia</u>	Mojave Fringe-toed Lizard	DS
<u>Crotaphytus insularis</u>	Desert Collared Lizard	DS
<u>Crotaphytus collaris</u>	Collared Lizard	DS
<u>Gambelia wislizeni</u>	Leopard Lizard	DS
<u>Sceloporus magister</u>	Desert Spiny Lizard	R,DS
<u>Urosaurus graciosus</u>	Long-tailed Brush Lizard	R,DS
<u>Urosaurus ornatus</u>	Tree Lizard	R,DS
<u>Uta stansburiana</u>	Side-blotched Lizard	DS
<u>Phrynosoma platyrhinos</u>	Desert Horned Lizard	DS
<u>Phrynosoma M'Calli</u>	Flat-tailed Horned Lizard	DS
<u>Xantusia vigilis</u>	Yucca Night Lizard	DS
<u>Chamidophorus tigris</u>	Western Whiptail	DS
<u>Heloderma suspectum</u>	Gila Monster	R,DS
<u>Leptotyphlops humilis</u>	Western Worm Snake	DS
<u>Diadophis regalis</u>	Regal Ring-necked Snake	R
<u>Phyllorhynchus decurtatus</u>	Spotted Leaf-nosed Snake	DS
<u>Coluber constrictor</u>	Racer	R
<u>Masticophis flagellum</u>	Common Whipsnake	R,DS
<u>Masticophis taeniatus</u>	Striped Whipsnake	R
<u>Salvadora hexalepis</u>	Western Patch-nosed Snake	DS

Arizona elegans  
Pituophis melanoleucus  
Pituophis melanoleucus  
Rhinocheilus lecontei  
Thamnophis marcianus  
Sonora semiannulata  
Chionactis occipitalis  
Chionactis cinctus  
Trimorphodon lambda  
Hypsiglena torquata  
Crotalus atrox

Crotalus cerastes  
Crotalus mitchelli  
Crotalus scutulatus  
Crotalus viridis

Glossy Snake	DS
Gopher Snake	R,DS
Common King Snake	R,DS
Long-nosed Snake	DS
Checkered Garter Snake	A,R
Western Ground Snake	R,DS
Western Shovel-nosed Snake	R,DS
Banded Sand Snake	DS
Arizona Lyre Snake	DS
Spotted Night Snake	DS
Western Diamondback	
Rattlesnake	R,DS
Sidewinder	R,DS
Speckled Rattlesnake	DS
Mojave Rattlesnake	DS
Western Rattlesnake	R,DS

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R = Riparian  
DS = Desert Scrub  
A = Aquatic  
M = Marsh

APPENDIX C  
LETTERS RECEIVED IN  
RESPONSE TO DKLIS

INDEX TO LETTERS  
RECEIVED IN RESPONSE TO DEIS

<u>From</u>	<u>Page(s)</u>
<b>FEDERAL</b>	
U.S. Department of Agriculture	
Forest Service	EIS-C-3
Soil Conservation Service	EIS-C-4
U.S. Department of Commerce	EIS-C-5
National Oceanic & Atmospheric Administration	EIS-C-6
U.S. Department of Interior	
Bureau of Land Management, Arizona State Office	EIS-C-7
Bureau of Land Management, Yuma District Office	EIS-C-8
Office of the Secretary (including U.S. Fish and Wildlife Service)	EIS-C-9,10,11
U.S. Fish and Wildlife Service (follow up letter)	EIS-C-12,13
Bureau of Indian Affairs	EIS-C-14,15
U.S. Environmental Protection Agency	EIS-C 16,17,18,19
<b>CALIFORNIA</b>	
Department of Fish and Game (Resources Agency)	EIS-C-20,21,22
Department of Fish and Game (follow up letter)	EIS-C-23,24
Department of Boating & Waterways (Resources Agency)	EIS-C-25,26
Department of Boating & Waterways (Resources Agency) follow-up letter	EIS-C-27
Office of Historic Preservation	EIS-C-28
<b>ARIZONA State Clearinghouse</b>	EIS-C-29,35,36
NACOG Region III	EIS-C-30
State Land Department	EIS-C-31
Natural Heritage Program	EIS-C-32
District IV Council of Governments	EIS-C-33
Department of Health Services	EIS-C-34
Game and Fish Department	EIS-C-37 through 45
Game and Fish Department follow-up letter	EIS-C-46,47,48
<b>NEVADA State Clearinghouse</b>	EIS-C-49
Department of Wildlife	EIS-C-50
Department of Wildlife follow-up letter	EIS-C-51
<b>Colorado River Indian Tribes</b>	EIS-C-52,53,54
Colorado River Indian Tribes follow-up letter	EIS-C-55,56



United States  
Department of  
Agriculture

Forest  
Service

RO

Reply to: 1950

Date Sept. 18, 1981

Paul W. Taylor  
Colonel, CE  
Commanding  
Dept. of the Army  
Los Angeles District, Corps of Engineers  
P.O. Box 2711  
Los Angeles, CA 90053

Dear Colonel Taylor:

Thank you for the opportunity to review the "Lower Colorado River Proposed General Permit Main Report and Draft Environmental Impact Statement."

Our review showed that no National Forest lands and resources are involved and, therefore, have no comments.

We are returning your copies of the Report and DEIS which you may want to keep for extra copies or to send to some other agencies. Also, it is not necessary to send us a copy of the final environmental impact statement.

Sincerely,

JON D. KENNEDY, Director  
Land Management Planning

Enclosure





United States  
Department of  
Agriculture

Soil  
Conservation  
Service

Room 3008, Federal Building  
230 North First Avenue  
Phoenix, Arizona 85025

October 9, 1981

Colonel Paul W. Taylor  
Civil Engineer  
Department of the Army  
Los Angeles District, Corps of Engineers  
P. O. Box 2711  
Los Angeles, CA 90053

Dear Colonel Taylor:

We have reviewed the Lower Colorado River Main Report and Draft Environmental Impact Statement and offer the following comment:

A discussion should be included that indicates the impacts of flooding on the proposed structures. Releases through the dams along the Colorado River would likely impact the proposed structures. You have also stated that an increase in stream sedimentation and a change in flow characteristics will result from installation of the proposed structures. Increased or a change in flooding locations are likely to occur.

If you have any questions regarding our comments, please let me know.

Sincerely,

Verne M. Bathurst  
State Conservationist



The Soil Conservation Service  
is an agency of the  
Department of Agriculture

112-0-1

SCS-AS-1  
10-79





**GENERAL COUNSEL OF THE  
UNITED STATES DEPARTMENT OF COMMERCE**  
Washington, D.C. 20230

NOV 9 1981

Commander  
Los Angeles District, Corps of Engineers  
Department of the Army  
P.O. Box 2711  
Los Angeles, California 90053

Dear Sir:

This is in reference to your draft environmental impact statement entitled, "Lower Colorado River Proposed General Permit." The enclosed comment from the National Oceanic and Atmospheric Administration is forwarded for your consideration.

Thank you for giving us an opportunity to provide this comment, which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

A handwritten signature in cursive script, reading "Robert T. Miki", is positioned above the typed name.

Robert T. Miki  
Director of Regulatory Policy

Enclosure Memo from: Robert B. Rollins  
National Ocean Survey  
NOAA



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SURVEY  
Rockville, Md. 20852

October 28, 1981

TO: PP/EC - Joyce M. Wood  
FROM: OA/C5 - Robert B. Rollins *RB*  
SUBJECT: DEIS 8110.10 - Lower Colorado River Proposed General Permit

The subject statement has been reviewed within the areas of the National Ocean Survey's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Director, National Geodetic Information Center (OA/C18) or Mr. Charles Novak, Chief, Network Maintenance Branch (OA/C172), at 6001 Executive Boulevard, Rockville, Maryland 20852.



100th ANNIVERSARY 1870-1980  
National Oceanic and Atmospheric Administration  
A young agency with a historic  
tradition of service to the Nation

EE2-C-6



# United States Department of the Interior

IN REPLY REFER TO  
1792 (920)

BUREAU OF LAND MANAGEMENT  
ARIZONA STATE OFFICE  
2409 VALLEY BANK CENTER  
PHOENIX, ARIZONA 85073

SEP 22 1981

Paul W. Taylor  
Colonel, CE Commanding  
Department of the Army  
Los Angeles District, Corps of Engineers  
P.O. Box 2711  
Los Angeles, CA 90053

Dear Sir:

Thank you for this opportunity to comment on the Lower Colorado River  
Proposed General Permit Main Report and Draft Environmental Impact  
Statement. We have no comment.

Sincerely,

A handwritten signature in cursive script, reading "Kenneth F. Reinert", is written over a horizontal line.

Kenneth F. Reinert, Chief  
Division of Planning and  
Environmental Coordination

cc: WO (202B)



# United States Department of the Interior

IN REPLY REFER TO  
1793 (YDO)

## BUREAU OF LAND MANAGEMENT

Yuma District Office  
Post Office Box 5680  
Yuma, Arizona 85364

NOV 13 1981

### Memorandum

To: Commander, Los Angeles District, Corps of Engineers,  
P. O. Box 2711, Los Angeles, CA 90053

From: District Manager, Yuma

Subject: Review of Lower Colorado River Proposed General Permit Draft  
Environmental Impact Statement

The Yuma District has reviewed the Draft Environmental Impact Statement for the Lower Colorado River Proposed General Permit, and offers the following comments:

- (1) The General Permit should favor the use of community boat docks in areas of private property, instead of allowing the expansion of single-lot structures to maximum density.
- (2) The text should mention the potential for the expansion of shoreline facilities at the Chemehuevi Indian Reservation, along the west shore of Lake Havasu. The Chemehuevi tribe is presently encouraging recreational and residential development in this area, particularly in the vicinity of the town of Havasu Lake, California.
- (3) Polygonum fusiforme, a candidate species for threatened or endangered classification (Federal Register, December 15, 1980, p. 82532), has been omitted from the list of sensitive plant species.

Beyond the few specific comments listed above, we find this to be an adequate assessment of the proposal and alternatives.

H. M. Bruce



## United States Department of the Interior

OFFICE OF THE SECRETARY  
Office of Environmental Project Review  
San Francisco, California

ER 81/1986

NOV 10 1981

Colonel Gwynn A. Teague  
District Engineer  
Corps of Engineers, U.S. Army  
P.O. Box 2711  
Los Angeles, California 90053

Dear Colonel Teague:

This responds to your letter of September 15, 1981, to the Director, Office of Environmental Project Review, requesting our evaluation and comments on the Draft Environmental Impact Statement and Main Report for the Lower Colorado River Proposed General Permit; Coconino, Mohave, and Yuma Counties, Arizona; San Bernardino, Riverside, and Imperial Counties, California; and Clark County, Nevada. The following comments are provided for your consideration.

### General Comments

Department of Interior agencies have supported the concept of a General Permit for boat docks in designated areas of the Colorado River for some time, as evidenced by the informal agreement with the Fish and Wildlife Service not to object to such permit applications in the Bullhead City and Parker Strip areas. The rationale behind this agreement was that these areas were already highly developed and that additional docks would not further adversely impact the environment. We indicated that we would continue this policy until such time that an environmental impact statement was prepared that would adequately document not only the impacts of individual docks at specific sites but also the cumulative effects of such development on the river. Although the subject document was intended to accomplish this objective, there is no evidence in the report that indicates cumulative impacts were addressed. Reference is made to information regarding sensitive environmental areas along the river. However, this information and subsequent analyses are lacking. These data should be documented in the EIS.

Another major problem with the proposed permit and its supporting EIS is that it is much too extensive in both the geographical area and the types of activities that are included. As previously mentioned, the original intent was to include only those areas already highly developed, but the draft EIS included almost the entire river from Lee's Ferry to the Mexican Border. We recommend a more limited area be included in the General Permit. The General Permit also included beaches, bulkheads, riprap, and

community docks, as well as individual boat docks. The potential adverse environmental impacts due to the first four mentioned categories, especially community facilities, are much too great to have them included under a General Permit. They should all be addressed in individual permits and given a level of review commensurate with their potential for environmental impacts.

The description of aquatic resources, in particular the section of fishes, has need for significant revision. Information presented suggests a lack of clear understanding of the status of fish fauna in the Colorado River system. In particular, distribution and abundance of native fishes need modification. Reports and work by Nevada Department of Wildlife, University of Nevada, and Arizona State University should be consulted.

#### Specific Comments

Page 22, 3rd paragraph - "Nutrient rich" is not a characterization which is consistent with the most recent data on this segment of the Colorado River. Report by Paulson and Baker (1980-81) should be referenced.

Page 28, Table 2 - Throughout the text on fish humpback sucker should be changed to razorback sucker as the accepted common name. The bonytail chub (*Gila elegans*) is Federally endangered and this is not mentioned in the discussion.

Page 31, paragraph 4 - This paragraph contains incorrect information. Although all three species of native fish have been collected in Lake Mead, the Colorado Squawfish is most likely extinct as a reproducing population and razorbacks and bonytails are extremely rare based on studies by Arizona Game and Fish Department (AGFD) and Nevada Department of Wildlife (NDW). No reliable records for Colorado Squawfish in Lake Mead exist after 1942.

Page 31, paragraph 6 - Lake Mohave supports the largest known population of adult razorbacks in the Lower Colorado River (Bureau of Reclamation (BR), Arizona State University (ASU), Fish and Wildlife Service (FWS) joint surveys 1978-81).

Page 31 - The literature citations for Deacon and Baker 1976 does not agree with reference list on page B-2.

Page 33, paragraph 5 - Recent inventories show that several species of mouthbreeders inhabit the Lower Colorado River. It would be better to simply refer to mouthbreeders or the genus Tilapia.

Page 35, paragraph 5 - It should be mentioned that amphipods in River Segment 1 are associated with microscopic algae and submergent vegetation.

Page 38 - The discussion of marshes does not accurately reflect the size or distribution. Topock Marsh, the upper end of Lake Havasu, and Imperial Wildlife Refuge all contain marsh areas. The use of the term "tule" after mentioning rushes is questioned. Generally tule is used to describe one or two species of bulrushes. No mention is made of Phragmites which becomes a dominant emergent from Blythe to the Mexican Border.

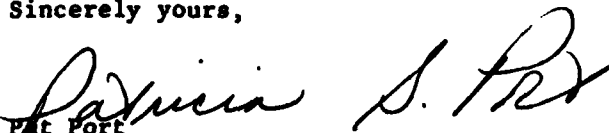
Page 42, Table 3 - Please explain "snowfall" values for Blythe and Yuma during the summer months.

Summary Comments

In summary, we find that the draft EIS is inadequate and should be revised to more accurately analyze the cumulative impacts. It should also be reduced in scope to include only those existing high density areas. We recommend that representatives of your staff meet with our Fish and Wildlife Service Ecological Services Field Office in Phoenix and our Bureau of Reclamation Office in Boulder City, Nevada, to discuss the draft EIS relative to the above comments. The continuation of the coordination is essential for future proposed permits along the Lower Colorado River.

We appreciate the opportunity to comment on the Draft Environmental Impact Statement and Main Report for the Lower Colorado River Proposed General Permit.

Sincerely yours,

  
Pat Port  
Regional Environmental Officer



**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE**



Ecological Services  
2934 W. Fairmount Avenue  
Phoenix, Arizona 85017

January 12, 1982

Colonel Paul W. Taylor, Commander  
Corps of Engineers, U.S. Army  
P.O. Box 2711  
Los Angeles, California 90053

Dear Colonel Taylor:

After reviewing the "Lower Colorado River Resource Sensitivities and Permit Criteria Report" and attending a meeting in Lake Havasu City on November 19, 1981 with representatives from your Los Angeles office, BLM and Arizona Game and Fish as recommended in our letter of November 6, 1981, the Department of Interior can now make specific recommendations regarding the proposed General Permit.

After consulting with representatives from the Arizona Game and Fish Department and the California Department of Fish and Game and in conjunction with on-site inspections, the following list of private lands and some Native American lands has been determined to be suitable for inclusion into the proposed General Permit area:

**California Shoreline:**

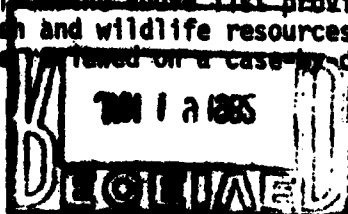
River Miles 244-246; 214-216; 197.9-198.2; 193.5-194.3; 179-181; 176.2-177; and 169.5-171.

**Arizona Shoreline:**

River Miles 181.2-182.7; 183.5-183.9; 185.0-185.5; 186.3-186.8; 189.5-189.8; 190.8-191.8; 245.5-246.0; 246.0-246.6; 247.35-248.15; 265.0-265.66; 265.72-269.75; 270.0-270.75; and 272.0-273.0.

These lands are mostly private and already in developed areas and therefore conform with the concept of the General Permit. It is not anticipated that additional impacts to the fish and wildlife resources will occur as a result of allowing development to proceed in these specific areas.

All other areas excluded from the above list provide or have the potential to provide significant fish and wildlife resources and any proposed activities should continue to be reviewed on a case-by-case basis.





If you have any questions or need additional information please contact this office.

Sincerely,

A handwritten signature in cursive script, appearing to read "Gilbert D. Metz".

Gilbert D. Metz, Field Supervisor  
for U.S. Department of Interior  
Coordinator

cc:  
John Carr, AGFD, Phoenix, Arizona  
Al Jackson, USFWS, Phoenix, Arizona  
Ron Powell, CDFG, Blythe, California

UNITED STATES GOVERNMENT  
**memorandum**

DATE: October 2, 1981  
REPLY TO: **ASSISTANT**  
ATTN OF: Area Director, Phoenix  
SUBJECT: Lower Colorado River Proposed General Permit,  
Main Report and Draft Environmental Impact Statement  
TO: District Engineer, Los Angeles District  
Corps of Engineers  
P. O. Box 2711  
Los Angeles, CA 90053

A review of your above subject has been completed. No reservation lands within the Phoenix Area jurisdiction will be directly impacted, however, we offer the following comments for the proposed general permit:

5. Proposed General Permit

Contiguous Bulkhead Wall with Backfill, page 14.

As a rule, there would be no problem in connecting with an existing wall on an adjoining property. However, in a General Permit situation, we would recommend that no two General Permits be issued along side of each other without doing a site visit.

Contiguous Rip-rap Slope - page 20.

Our previous comment would apply in this situation. It would also disclose if the slope is stable at the previous site, and allow for modification of material, or perhaps, change of site, or result in no issuance of a permit.

Sand Beach - page 20.

A few concerns would be that material "containing not more than 12% silt by volume" and "associated grading activities not more than 5 feet riverward of the ordinary high water mark" not be the only things considered in addition to the 60 feet in length requirement. The "Sandy Beaches" should be 1) compatible to the site, and 2) energy of the system should be evaluated to examine if a sandy beach could possibly be retained in that particular site. Therefore, we would recommend that whenever two General Permits are requested within approximately 1 mile of each other, an on-site visit should be planned.

Community Boat Docks - page 20.

We would not object to floating boat docks, however, when General Permits are requested immediately adjacent to each other, then, an on-site inspection should be completed.

Should you have any questions concerning our comments, please contact Mr. Robert Berger, Environmental Protection Specialist at FTS 261-2275.

We appreciate the opportunity to review and comment on your General Permit.

A handwritten signature in black ink, appearing to read "Robert Berger", is written in a cursive style.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

215 Fremont Street  
San Francisco, Ca. 94105

Project #D-COE-K39016-00

NOV 13 1981

Colonel Paul W. Taylor, CE  
Los Angeles District, Corps of Engineers  
P.O. Box 2711  
Los Angeles, CA 90053

Dear Colonel Taylor:

The Environmental Protection Agency (EPA) has received and reviewed the Draft Environmental Impact Statement (DEIS) titled LOWER COLORADO RIVER PROPOSED GENERAL PERMIT.

The EPA's comments on the DEIS have been classified as Category LO-2. Definitions of the categories are provided by the enclosure. The classification and the date of the EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal Actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

Although we fully support the approach that the Corps of Engineers is taking in this General Permit proposal, we are concerned that the potential cumulative impacts have not been fully explored and that the area proposed to be covered by the General Permit is too large for successful implementation. Our detailed comments are attached.

The EPA appreciates the opportunity to comment on this DEIS and requests five copies of the Final Environmental Impact Statement when available.

If you have any questions regarding our comments, please contact Susan Sakaki, EIS Review Coordinator, at (415) 974-8137 or FTS 454-8137.

Cordially yours,

  
SONIA F. CROW  
Regional Administrator

Enclosure

EIS-C-16

### General Comment

The Draft Environmental Impact Statement (DEIS) and the Main Report do not clearly explain or graphically demonstrate the areas covered by the permit; nor do the documents explain why certain small areas are excluded. A synopsis of the criteria used to include or exclude river segments should be included in the FEIS. Also, the maps should be revised or more clearly annotated to reflect the existing structures, land ownership, institutional use, and sensitive resource areas.

### 404 Permit Comments

The proposed General Permit appears to include almost the entire lower Colorado River. As stated on page EIS-3, the inclusion of all Federal lands adjacent to the river is based on the rationale that "The General Permit will be subservient to the planning policies of the managing Federal agencies, and such policies are subject to analysis under the National Environmental Policy Act (NEPA)." Although the 404 Permit and NEPA procedures dovetail, they do not exactly duplicate each other. It is doubtful that the existing environmental assessment process under NEPA will satisfy all of the requirements under Section 404 of the Clean Water Act (CWA). Furthermore, the DEIS does not demonstrate that the affected Federal agencies understand and accept this responsibility.

Federal Guidelines at 40 CFR 230.7(b)(2) state:

Activities otherwise similar in nature may differ in environmental impact due to their location in or near ecologically sensitive areas.

Inclusion of all Federal lands in the area of permitting avoids the issue of resource sensitivity at specific sites. If permit activity is unlikely to occur in parks and established wildlife refuges, these areas should be excluded from the General Permit. The Final EIS should include an estimate of the number of activities likely to be regulated under the General Permit until its expiration, pursuant to 40 CFR 230.7(b)(3).

### Water Quality Comments

The DEIS does not completely address the proposal's cumulative and long-term impacts on water quality. For example:

- (a) The proposed General Permit would not regulate the number of beaches that can be developed, in spite of the fact that Appendix A, page A-11 notes that increased flow velocity and increased sedimentation may result from the construction of beaches.
- (b) Bulkhead construction is regulated to allow construction adjacent to existing structures. If "existing structure" is interpreted to mean any structure existing at the time of the proposed new construction (as opposed to structures that exist at a defined point in time, the effective date of the permit), then it is possible that for undefined miles of the river, bulkhead structures could be erected one after another, resulting in "higher stream velocities and an increased potential for sediment transport and scouring." The discussion on page A-13 goes further to note that "Two hundred to three hundred feet of bulkheads along a fast flowing section of river could have significant effects of fish populations and stream characteristics."

Although we acknowledge that the authorized structures allowed under the proposed General Permit are of minimal impact individually, the potential impact of these activities in the total area of the proposed permit is definitely not minimal. The FEIS should address more directly the issue of cumulative impact and necessary mitigation measures for the protection of the river. The General Permit should include provisions for mitigating these cumulative impacts.

### Air Quality Comments

The Main Report and DEIS adequately address the air quality effects of the proposed General Permit. There are, however, a few inaccuracies that should be corrected:

- 1. In Table 4, page 44, the Federal standard (primary and secondary) for ozone should be  $235 \text{ ug/m}^3$  (0.12 ppm) (see 40 CFR §50.9).
- 2. In Table 4, page 44, the Federal standard (primary and secondary) for lead is  $1.5 \text{ ug/m}^3$ , maximum arithmetic mean averaged over a calendar quarter (see 40 CFR §50.12).
- 3. In the first paragraph on page 45, the report states that the EPA classifies the areas (Navajo power plant near Page and Mohave power plant near Bullhead City) as non-attainment. The statement should be revised to say that only the Navajo/Page area has been classified as non-attainment.

## EIS CATEGORY CODES

### Environmental Impact of the Action

#### IO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

#### ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

#### EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

### Adequacy of the Impact Statement

#### Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

#### Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

#### Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Resources Building  
1416 Ninth Street  
95814

(916) 445-8058

Department of Conservation  
Department of Fish and Game  
Department of Forestry  
Department of Boating and Waterways  
Department of Parks and Recreation  
Department of Water Resources

EDMUND G. BROWN JR.  
GOVERNOR OF  
CALIFORNIA



THE RESOURCES AGENCY OF CALIFORNIA  
SACRAMENTO, CALIFORNIA

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Colorado River Board  
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and Development Commission  
Regional Water Quality  
Control Board  
San Francisco Bay Conservation  
and Development Commission  
Solid Waste Management Board  
State Coastal Conservancy  
State Lands Commission  
State Reclamation Board  
State Water Resources Control  
Board

Colonel Paul W. Taylor  
U.S. Army Corps of Engineers  
Post Office Box 2711  
Los Angeles, CA 90053

November 3, 1981

Dear Colonel Taylor:

The State of California has reviewed the Main Report and Draft EIS, Lower Colorado River, Proposed General Permit, submitted through the Office of Planning and Research. This review, in accordance with OMB Circular A-95 and the National Environmental Policy Act of 1969, was coordinated with the Air Resources, Colorado River, and Water Resources Control Boards; State Lands Commission; and Departments of Boating and Waterways, Conservation, Fish and Game, Parks and Recreation, Water Resources, and Transportation.

The Department of Fish and Game (DFG) comments that although it does support the concept of a General Permit Zone, this proposal is too extensive and would lead to a serious loss of the public's right to use public waters. DFG also cannot concur with many of the statements made in the report.

DFG would support a scaled-down version of the General Permit Zone, allowing private boat docks to applicants in already-developed areas where adjacent landowners have private boat docks. DFG would also support public-use marinas and piers in selected areas of the river. These facilities should be available for equal use by all the boating public, including owners of property along the river. Control of sanitation and litter could be better accomplished at such areas.

DFG recommends a meeting with representatives from the Corps, U.S. Fish and Wildlife Service, DFG, and Arizona Game and Fish, to review and to evaluate the data used in sensitivity mapping. The document is inadequate in its presentation of data, judgments used, estimates of values, and studies performed upon which the sensitivity maps were based. DFG would have to review this information before concurring with the conclusions discussed in the Draft EIS.

Until DFG can meet and discuss the sensitivity classifications, the following River Mile areas should not be included in the General Permit Zone classification, because they have high quality fish and wildlife areas:



Page two  
Col. Taylor

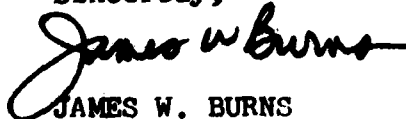
1. 34.0-34.5 Confluence of Gila River and the Colorado River. High fishery value and wading bird feeding area.
2. 49.0-67.0 Imperial Dam, Ferguson Lake, and Imperial National Wildlife Refuge. High quality riparian habitats used by deer, Yuma clapper rail, and waterfowl.
3. 75.5-86.0 State Section 36: Velian Lake and Draper Lake. High quality deer and bighorn sheep habitat. Riparian zone used by Yuma clapper rail, waterfowl, and shorebirds.
4. 99.5-101.0 Oxbow Lake. Mitigation area with aquatic and fishery values used by waterfowl.
5. 105.5-106.5 Horace Miller Park. Shoreline levees road and riprapped banks.
6. 113.0-119.0 Goose Flats, Ehlers Backwater, and Allied Backwater. Mitigation areas contain aquatic and fishery values. Riparian habitat used by birds and waterfowl.
7. 122.0-130.0 Big Hole (State owned) aquatic habitat fishery. Waterfowl and shorebird values. 6th Avenue Park (Mayflower).
8. 131.0-134.0 High value fishery area below dam. Shoreline riprapped levee.
9. 152.0-153.0 Riparian habitat. Has aquatic values and is a fishery and waterfowl area.
10. 161.0-164.0 High quality riparian zone aquatic habitat. Has deer, fishery, and waterfowl values.
11. 165.0-166.0 High quality aquatic and riparian habitats. Contains fishery and waterfowl values.
12. 172.0-173.0 Big River Estates. Riprapped levee road.
13. 176.2-177.0 Aquatic habitats with waterfowl and fishery values.
14. 181.0-191.8 Aquatic habitats with fishery and waterfowl values.
15. 193.0-231.3 Aquatic habitats with striped bass recruitment and nursery areas and adult striped bass feeding areas.
16. 231.8-242.2 Aquatic habitats with riparian, fishery, non-game birds, and waterfowl habitat values.
17. 242.6-252.0 General Permit Zone should include only those shorelines which are developed. Other vacant lands should be exclusions within the General Permit Zone.

Page three  
Col. Taylor

Questions concerning these comments should be directed to Fred Worthley, Jr., Regional Manager, DFG, 350 Golden Shore, Long Beach, CA 90802 or (213) 590-5113.

We appreciate having an opportunity to review this document.

Sincerely,



JAMES W. BURNS  
Assistant Secretary for Resources

cc: Office of Planning and Research  
1400 Tenth Street  
Sacramento, CA 95814

(SCH 81092501)

## DEPARTMENT OF FISH AND GAME

350 Golden Shore  
Long Beach, CA 90802  
(213) 590-5113



November 27, 1981

Colonel Paul W. Taylor  
U. S. Army Corps of Engineers  
Los Angeles District  
P.O. Box 2711  
Los Angeles, CA 90053

Dear Colonel Taylor:

In an earlier letter from California's Resources Agency it was requested that a meeting be held between representatives of our respective agencies and others to discuss the proposed General Permit documents.

That meeting was held on November 12, 1981. The discussions and compromises which resulted from that meeting have led to a General Permit proposal with which we can agree.

Pursuant to our understanding of the meeting, we now withdraw our concerns regarding the General Permit Zone with the following stipulations:

1. Pertaining to the California shoreline, the lands identified as Federal ownership will be withdrawn from the General Permit Zone.
2. Privately owned lands in the Needles area (River Miles 244 to 246 and 247.5 to 248) will be an approved section of the California shoreline in the General Permit Zone.
3. Native American lands in the Havasu Landing area (between River Miles 214 to 216) will be an approved section of the California shoreline in the General Permit Zone.
4. Developed lands in the Black Meadow Landing area (North of the Point at River Mile 197.9 to 198.2) will be an approved section of the California shoreline in the General Permit Zone.

Colonel Taylor

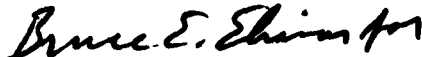
-2-

November 27, 1981

5. Metropolitan Water District facilities on Lake Havasu (River Mile 193.5 to 194.3) will be an approved section of the California shoreline in the General Permit Zone.
6. Native American lands in the lower Parker Strip (River Mile 179 to 181) will be an approved section of the California shoreline in the General Permit Zone.
7. Developed lands in the Parker Bridge area (River Mile 176.2 to 177) will be an approved section of the California shoreline in the General Permit Zone.
8. Developed lands in the Big River area (River Mile 169.5 to 171) will be an approved section of the California shoreline in the General Permit Zone.
9. The Corps will inform applicants of projects within the General Permit Zone that they must contact the California Department of Fish and Game and comply with Fish and Game Code Section 1601-03 before commencing work.
10. Any applicant proposing to use a suction dredge must also contact the California Department of Fish and Game as this state also has a dredge permit program which must be complied with.

If you have any questions or require further information, please do not hesitate to contact either myself or Ron Powell.

Sincerely,



Fred A. Worthley Jr.  
Regional Manager  
Region 5

cc: Resources Agency  
ESB - Sacramento  
Reg'l. Mgr, IPS, WMS, ESS  
Elythe (2)

Resources Building  
1418 Ninth Street  
95814

(916) 445-6656

Department of Conservation  
Department of Fish and Game  
Department of Forestry  
Department of Boating and Waterways  
Department of Parks and Recreation  
Department of Water Resources

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GOVERNOR OF  
CALIFORNIA



THE RESOURCES AGENCY OF CALIFORNIA  
SACRAMENTO, CALIFORNIA

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and Development Commission  
Regional Water Quality  
Control Boards  
San Francisco Bay Conservation  
and Development Commission  
Solid Waste Management Board  
State Coastal Conservancy  
State Lands Commission  
State Reclamation Board  
State Water Resources Control  
Board

Colonel Paul W. Taylor  
District Engineer  
Los Angeles District  
U.S. Army Corps of Engineers  
Post Office Box 2711  
Los Angeles, CA 90053

1981 NOV 5

Dear Colonel Taylor:

In a letter dated November 3, 1981, the State of California transmitted State comments on the Main Report and Draft EIS, Lower Colorado River, Proposed General Permit.

After that letter was sent to you we received the attached comment from the California Department of Boating and Waterways. We regret any confusion or delay this may cause, but the State would appreciate having the comments considered as a part of its official response regarding this project.

Sincerely,

A handwritten signature in cursive script, appearing to read 'James W. Burns', written over the printed name.

JAMES W. BURNS  
Assistant Secretary for Resources

cc: State Clearinghouse  
Office of Planning and Research  
1400 Tenth Street  
Sacramento, CA 95814  
(SCH No. 81092501)

## Memorandum

To : (1) Jim Burns, Projects Coordinator  
Resources Agency

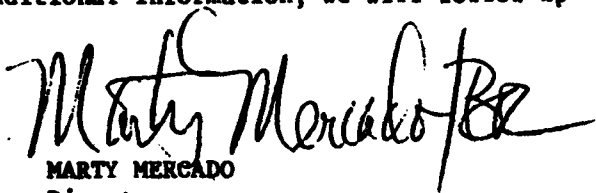
Date : NOV 4 1981

(2) Commander  
U. S. Army Corps of Engineers  
Los Angeles District  
P. O. Box 2711  
Los Angeles, CA 90053

Subject: SCH#81092501: Proposed  
General Permit - Lower  
Colorado River

From : Department of Boating and Waterways

The Department of Boating and Waterways (Cal Boating) has reviewed the Main Report and Draft Environmental Impact Statement for the proposed General Permit on the Lower Colorado River. We are concerned that the General Permit would apply to the less developed, more sensitive areas of the river. We have requested the Corps to send us additional material (sensitivity maps) so that we can do a more thorough review of this proposal. It is our understanding that these sensitivity maps will be distributed by the Corps to all reviewing agencies. Once we have had an opportunity to look at this additional information, we will follow up with our final comments.

  
MARTY MERCADO  
Director

Resources Building  
1416 Ninth Street  
95814

(916) 445-5888

Department of Conservation  
Department of Fish and Game  
Department of Forestry  
Department of Boating and Waterways  
Department of Parks and Recreation  
Department of Water Resources

EDMUND G. BROWN JR.  
GOVERNOR OF  
CALIFORNIA



THE RESOURCES AGENCY OF CALIFORNIA  
SACRAMENTO, CALIFORNIA

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Colorado River Board  
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and Development Commission  
Regional Water Quality  
Control Boards  
San Francisco Bay Conservation  
and Development Commission  
Solid Waste Management Board  
State Coastal Conservancy  
State Lands Commission  
State Reclamation Board  
State Water Resources Control  
Board

1982 JAN 7

Colonel Paul W. Taylor  
District Engineer  
Los Angeles District  
U.S. Army Corps of Engineers  
Post Office Box 2711  
Los Angeles, CA 90053

Dear Colonel Taylor:

In a letter dated November 3, 1981, the State transmitted State comments on the Main Report and Draft EIS, Lower Colorado River, Proposed General Permit. On November 5, 1981, the State transmitted comments of the Department of Boating and Waterways which requested additional material for a more thorough review.

The original concern of the Department of Boating and Waterways was that the general permit would apply to the less developed, more sensitive areas of the river. The Department has since reviewed the additional material and made a more thorough analysis of the project. The Department, therefore, does not object to issuance of a general permit for the lower Colorado River.

Sincerely,

A handwritten signature in dark ink, appearing to read "Charles K. Johnson".  
JAMES W. BURNS

Assistant Secretary for Resources

cc: State Clearinghouse  
Office of Planning and Research  
1400 Tenth Street  
Sacramento, CA 95814  
(SCH No. 81092501)

SECRET

EIS-C-27

**OFFICE OF HISTORIC PRESERVATION**  
DEPARTMENT OF PARKS AND RECREATION  
POST OFFICE BOX 2890  
SACRAMENTO, CALIFORNIA 95811

October 13, 1981

Colonel Paul W. Taylor  
Los Angeles District, Corps of Engineers  
P.O. Box 2711  
Los Angeles, CA 90053

RE: DEIS Lower Colorado River Proposed General Permit

Dear Col. Taylor:

The Office of Historic Preservation cannot complete its review of the environmental document referenced above without additional information. A copy of the cultural resources assessment report prepared for the proposed project should be submitted to this office for incorporation into our review process.

If you have any questions concerning this review, please contact Michael Rondeau, Staff Archeologist, at the Office of Historic Preservation by calling (916) 445-6766.

  
Dr. Knox Mellon  
State Historic Preservation Officer



SUNOFF

OMB Approval No. 29-R0218

<b>FEDERAL ASSISTANCE</b>		2. Applicant's application		3. Date application identifier		4. Number	
1. Type of Action <input type="checkbox"/> Preapplication <input type="checkbox"/> Application <input type="checkbox"/> Notification Of Intent (Opt.) <input type="checkbox"/> Report Of Federal Action		h. Date 19 Year Month Day		Date Year month day		Assigned 19 81 09 30	
Leave Blank		NOV 13 1981		Peta Leija-Lyba			
4. Legal Applicant/Recipient a. Applicant Name : U.S. Army Corps of Engineers b. Organization Unit : Los Angeles District c. Street/P.O. Box : P.O. Box 2711 d. City : Los Angeles e. County : f. State : California g. Zip Code : 90053 h. Contact Person : Commander (Name & telephone no.)				5. Federal Employer Identification No.			
6. Program (From Federal Catalog) a. Number 1120999 b. Title Unknown Defense, Dept. of the Army, Corp. of Engineers				7. Type of applicant/recipient A-State B-Special Purpose District C-County D-Community Action Agency E-Higher Educational Institution F-City G-Indian Tribe H-School District I-Other (Specify): Federal Agency Enter appropriate letter <input checked="" type="checkbox"/> K			
7. Title and description of applicant's project Lower Colorado River Proposed General Permit-Main Report & Draft Environmental Impact Statement The proposed General Permit is designed to alleviate processing delays and to minimize cumulative losses from future District-permitted development. These are two areas of concern under the present practice of considering each application under the individual Permit process.				8. Type of assistance A-Basic Grant B-Supplemental Grant C-Loan D-Insurance E-Other Enter appropriate letter(s) <input type="checkbox"/> a			
10. Area of project impact (Names of cities, counties, states, etc.) Cocconino, Mohave, Yuma Cos. Arizona				11. Estimated number of persons benefiting		12. Type of application A-New B-Renewal C-Revision D-Continuation E-Augmentation Enter appropriate letter <input type="checkbox"/> a	
13. Proposed Funding a. Federal \$ .00 b. Applicant .00 c. State .00 d. Local .00 e. Other .00 f. Total \$ .00		14. Congressional Districts Of: a. Applicant b. Project 16. Project Start Date Year month day 19 17. Project Duration Months 18. Estimated date to be submitted to federal agency 19		15. Type of change For 12c or 12e A-Increase Dollars B-Decrease Dollars C-Increase Duration D-Decrease Duration E-Cancellation F-Other Specify: Enter appropriate letter(s) <input type="checkbox"/> a			
20. Federal agency to receive request (Name, city, state, zip code)						21. Remarks added <input type="checkbox"/> Yes <input type="checkbox"/> No	
22. The Applicant Certifies That a. To the best of my knowledge and belief, data in this preapplication/application are true and correct, the document has been duly authorized by the governing body of the applicant and the applicant will comply with the attached assurances if the assistance is approved. b. If required by OMB Circular A-95 this application was submitted, pursuant to instructions therein, to appropriate clearinghouses and all responses are attached: (1) Arizona State Clearinghouse (2) Region III Clearinghouse (NACOG) (3) Region IV Clearinghouse (Dist IV)		No response		Response attached <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>			
23. Certifying representative a. Typed name and title b. Signature c. Date signed Year month day 19		24. Agency name 25. Application received 19 Year month day					
26. Organizational Unit 27. Administrative office 28. Federal application identification 29. Address 30. Federal grant identification		31. Action taken <input type="checkbox"/> a. Awarded <input type="checkbox"/> b. Rejected <input type="checkbox"/> c. Returned for amendment <input type="checkbox"/> d. Deferred <input type="checkbox"/> e. Withdrawn 32. Funding a. Federal \$ .00 b. Applicant .00 c. State .00 d. Local .00 e. Other .00 f. Total \$ .00 33. Action date 19 Year month day 34. Starting date 19 Year month day 35. Contact for additional information (Name and telephone number) 36. Ending date 19 Year month day 37. Remarks added <input type="checkbox"/> Yes <input type="checkbox"/> No					
38. Federal agency A-95 action a. In taking above action, any comments received from clearinghouses were considered. If agency response is due under provisions of Part 1, OMB Circular A-95, it has been or is being made. b. Federal Agency A-95 Official (Name and telephone number)							

424-101

EIS-C-29

Standard Form 424 Page 1 (10-75)  
Prescribed by GSA, Federal Management Circular 74-7

TO:

State Application Number (SAR)

Sept. 30, 1981 State AZ No. 81-80-0059

Christopher J. Bavasi, Ex. Dir.  
NACOG, Region III  
119 E. Aspen St.  
Flagstaff, Arizona 86001

Game and Fish  
Az. Natural Heritage Prog.  
Health  
Water  
AORCC  
Land  
Parks  
Indian Affairs

Region IV  
III

FROM: Arizona State Clearinghouse  
1700 West Washington Street, Room 505  
Phoenix, Arizona 85007

**NACOG**  
OCT 01 '81  
**RECEIVED**

This project is referred to you for review and comment. Please evaluate as to the following questions. After completion, return **THIS FORM AND ONE XEROX COPY** to the Clearinghouse no later than **17 WORKING DAYS** from the date noted above. Please contact the Clearinghouse at 255-5004 if you need further information or additional time for review.

☒ No comment on this project ☐ Proposal is supported as written ☐ Comments as indicated below

1. Is project consistent with your agency goals and objectives? ☐ Yes ☐ No ☐ Not Relative to this agency
2. Does project contribute to statewide and/or areawide goals and objectives of which you are familiar? ☐ Yes ☐ No
3. Is there overlap or duplication with other state agency or local responsibilities and/or goals and objectives? ☐ Yes ☐ No
4. Will project have an adverse effect on existing programs with your agency or within project impact area? ☐ Yes ☐ No
5. Does project violate any rules or regulations of your agency? ☐ Yes ☐ No
6. Does project adequately address the intended effects on target population? ☐ Yes ☐ No
7. Is project in accord with existing applicable laws, rules or regulations with which you are familiar? ☐ Yes ☐ No

Additional Comments (Use back of sheet, if necessary):

Reviewers Signature

*Josephine J. P... for*

Date

10-22-81

Title Christopher J. Bavasi, Executive Director

MS-6-30

Telephone 774-1094

TO:

Joe F. Fallini, Commissioner  
State Land Department  
1624 W. Adams, 4th Floor  
Phoenix, AZ 85007  
Attn: Robert Yount

State Application Number (SAI)

Sept. 30, 1981

State AZ No. 81-80-0059

Game and Fish  
Az. Natural Heritage Prog.  
Health  
Water  
AORCC  
Land  
Parks  
Indian Affairs

Region IV &  
III

FROM: Arizona State Clearinghouse  
1700 West Washington Street, Room 505  
Phoenix, Arizona 85007

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7. Is project in accord with existing applicable laws, rules or regulations with which you are familiar? ☐ Yes ☐ No

Additional Comments (Use back of sheet, if necessary):

Reviewer's Signature

*Robert Yount*

Date October 2, 1981

Title

Land Manager

Telephone 255-4625

TO:

Sept. 30, 1981

State and Fed. 81-80-0059

Mr. Terry B. Johnson  
Arizona Natural Heritage Program  
30 North Tucson Boulevard  
Tucson, Arizona 85716

Game and Fish  
Az. Natural Heritage Program  
Health  
Water  
AORCC  
Land  
Parks  
Indian Affairs

Region IV &  
III

FROM: Arizona State Clearinghouse  
1700 West Washington Street, Room 505  
Phoenix, Arizona 85007

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Additional Comments (Use back of sheet, if necessary):

Reviewers Signature

*Terry B. Johnson*

Date

*Oct. 19, 1981*

Title

*Coordinator, ANHP*

ARS-C-32

Telephone

*323-0447*

TO:

State Application Identifier (SAI)

Sept. 30, 1981

State AZ No. 81-80-0059

Frank G. Servin, Exec. Dir.  
District IV Council of Gov'ts.  
1020 Fourth Ave., Suite 201  
Yuma, AZ 85364

Game and Fish  
Az. Natural Heritage Prog.  
Health  
Water  
AORCC  
Land  
Parks  
Indian Affairs

Region IV &  
III

FROM: Arizona State Clearinghouse  
1700 West Washington Street, Room 505  
Phoenix, Arizona 85007

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☐ Proposal is supported as written

☐ Comments as indicated below

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7. Is project in accord with existing applicable laws, rules or regulations with which you are familiar? ☐ Yes ☐ No

Additional Comments (Use back of sheet, if necessary):

Reviewer's Signature

*[Handwritten Signature]*

Date

11-17-81

Title

*[Handwritten Title]*

ETS-C-33

Telephone

732-532

State Application Identifier (SAI)

TO

Sept. 30, 1981

81-80-0039

Dr. James Sam, M.D., Director  
Department of Health Services  
1740 West Adams Street  
Phoenix, AZ 85007

Game and Fish  
Az. Natural Heritage Prog.  
Health  
Water  
AORCC  
Land  
Parks  
Indian Affairs

Region IV &  
III,

FROM: Arizona State Clearinghouse  
1700 West Washington Street, Room 505  
Phoenix, Arizona 85007

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  7. Is project in accord with existing applicable laws, rules or regulations with which you are familiar? ☐ Yes ☐ No

Additional Comments (Use back of sheet, if necessary):

Reviewer's Signature

*Patricia Williams*

Date

11/19

Title

ETH

818-0-34

Telephone

1131

**ARIZONA**

OFFICE  
OF THE  
GOVERNOR  
BRUCE BABBITT



**OFFICE OF  
ECONOMIC PLANNING AND DEVELOPMENT**

Larry Landry, Director • (602) 255-5371 • General Offices of OEPAD • 4th Floor

MEMORANDUM

TO: Applicant

FROM: Arizona State Clearinghouse

DATE: NOV 20 1991

RE: Comment After Signoff

Enclosed is a copy of a response, concerning the attached project,  
which was received by us after our Signoff to you.

A copy of the response is to be forwarded to the Federal Agency.

MIS-C-35

Mailing Address: Executive Tower Room 505 • 1700 West Washington • Phoenix, Arizona 85007

ARIZONA  
OFFICE OF THE  
GOVERNOR  
BRUCE BABBITT



OFFICE OF  
**ECONOMIC PLANNING AND DEVELOPMENT**

Larry Landry, Director • (602) 255-5371 • General Offices of OEPAD • 4th Floor

MEMORANDUM

TO: Applicant

FROM: Arizona State Clearinghouse

DATE: NOV 25 1981

RE: Comments After Signoff

Enclosed are copies of responses, concerning the attached project, which was received by us after our Signoff to you.

A copy of the responses are to be forwarded to the Federal Agency.

RES-C-16

Mailing Address: Executive Tower Room 415 • 1400 West Washington • Phoenix, Arizona 85007



**BRUCE BABBITT, Governor**

**Commissioners:**

**WILLIAM M. BEERS, Prescott, Chairman**  
**CHARLES F. ROBERTS, O.D., Bisbee**  
**FRANK PERCIVON, JR., Yuma**  
**FRANCES W. WERNER, Tucson**  
**CURTIS A. JENNINGS, Scottsdale**

**Director**  
**BUD BRISTOW**

**Deputy Director**  
**ROGER J. GRUENEWALD**



**ARIZONA GAME & FISH DEPARTMENT**

*2222 West Greenway Road Phoenix, Arizona 85023 942-3020*

November 12, 1981

Colonel Paul W. Taylor, Commander  
Department of the Army  
Los Angeles District, Corps of Engineers  
P. O. Box 2711  
Los Angeles, California 90053

Re: Main Report and DEIS  
Lower Colorado River  
Proposed General Permit  
September 1981

Dear Colonel Taylor:

The Arizona Game and Fish Department has reviewed the above-referenced document and respectfully submits the following comments.

The Department generally supports the concept of a "general permit", whereby certain defined structures, e.g., docks, piers, and moorings (projections into the public waterway), would be covered and regulated as to number, size, penetration into the waterway, etc.; also, that there may be legitimate areas along the lower Colorado River where the general permit could be applied. However, the Department does not concur with the Corps' evaluation of available data, nor the decision to implement the proposed alternative (General Permit), as outlined. Mention is made in the subject document of biologically sensitive areas, and yet, these areas are not well documented, adequately discussed, nor are they designated as such on maps of the study area (A-1 thru A-14). Furthermore, the cumulative impacts (a major concern for and aspect of the study and DEIS) are not well documented or discussed. A major contention of the Department, regarding docks or projections into the public waterway, is that they either preclude public use of the shoreline or near shore area, or they interrupt this use, particularly by boat fishermen, but also by other boating recreationists. Whether or not the adjacent terrestrial land is privately owned should make no significant difference in the decision-making for a protruding structure.

RTB-C-37

AN EQUAL OPPORTUNITY AGENCY

November 12, 1981

The Department, in past responses to public notices for private structures (docks, piers, etc.) has reiterated the Colorado River Wildlife Council's position (resolution dated March 1969) concerning private structures and the preference for public facilities. The Department also noted that the support/preference for public facilities was based on a legitimate need, as long as such developments did not produce or encourage significant adverse impacts on the fish and wildlife resources.

The Department believes and recommends that the Corps make a complete re-evaluation of the available information and data concerning present natural resource values, impacts, and needs within the subject study area. The justification and criteria for designating a "general permit" and the area to which it would be applied should be discussed at a coordination meeting with the various federal and state agencies that have land/resource management responsibilities on the lower Colorado River and, hopefully, a consensus can be reached by the participants; followed up by a formal letter of concurrence.

Upon review of the subject document, the Department is somewhat dismayed by the Corps' apparent attempt to relinquish a major portion of its responsibility to administer and police the permit system on the lower Colorado River; in preference to administration by individual land managing agencies. If the process would proceed as stated with the General Permit alternative, whereby administering agencies would control development on their lands, it would seem mandatory that a permit would first have to be acquired from the administering agency before a Corps permit could be issued (for example, a concessionaire on BLM land). In the State of Arizona, since the State owns the submerged land from the ordinary high waterline to the center of the river or stateline, for most of the length of the subject study area, the State Land Department would have to issue a permit to build on or over the State land, no matter whether the adjacent land is federally or privately owned. If this is the case, it would seem that all permit applications would have to be reviewed, individually, rather than be handled by a "general permit".

In comparing the three alternatives and the impact discussions pertaining to each, it is unclear as to how the No-Action alternative would result in the maximum build-out of boat docks and bulkhead/rip-rap alignments, unless the Corps approved all applications for such structures, regardless of impacts.

In summary, the Department sincerely recommends that a coordination meeting between all concerned land/resource management agencies be

Colonel Paul W. Taylor

- 3 -

November 12, 1981

scheduled to discuss the "general permit" concept and any possible areas for its application. In the interim, we recommend that permit processing follow the present (No-Action) system, unless a temporary moratorium on new permits would aid the Corps' efforts to process applications that are already in the "mill". The Department has provided comments regarding specific segments of the subject document which are provided on a separate attachment to this letter.

We appreciate the opportunity to review the subject document and to provide comments.

Sincerely,

Bud Bristow, Director



Robert K. Weaver  
Habitat Evaluation Coordinator  
Planning and Evaluation Branch

RKW:dd

Attachment

cc: Don Metz, U.S.F.W.S., Phoenix  
Wes Martin, Supervisor, Kingman Regional Office  
Don Wingfield, Supervisor, Yuma Regional Office  
State Clearinghouse, AZ 81-80-0059

Attachment  
Comments on Specific Segments of Corps Document

Page 22, Paragraph 3:

The statements addressing the water quality in Segment 1 of the Colorado River are inaccurate. Phosphorus loading in Lake Mead has decreased 80-90% since the completion of Glen Canyon Dam, and Upper Lake Mead is considered oligotrophic. Furthermore, the nitrogen level in Lake Mead is considered satisfactory (Prentki, Paulson and Baker, 1981).

Page 27, Paragraph 5:

The last sentence is incorrect. More endangered species are located in the upper river segments than in the lower segments of the Colorado River.

Page 27, Paragraph 6:

The bonytail chub, and the Colorado squawfish are two additional endangered species which may occur in this portion of the Colorado River.

Suttkus and Clemmer (1977) and Minckley (1973) are two additional references to the presence of the humpback chub occurring in the Colorado River mainstream.

Page 28, Table 2:

Corrections in this table are needed as follows:

- Humpback chub is a federally-listed endangered species;
- Bonytail chub is a federally-listed endangered species and probably does not occur in subareas B and C of Segment 2.
- Roundtail chub (Gila robusta seminuda) occurs in the Virgin River.
- Colorado squawfish is a federally-listed endangered species, and does not occur in Segment 2.
- Woundfin does not occur in Subarea C of Segment 2, but does occur in the Virgin River.
- Razorback sucker (Xyrauchen texanus) requires addition to the native species list and occurs in Segment 1 and subareas A, B, and C of Segment 2.

Page 28, Table 2 (Cont'd):

- Threadfin shad occur in Segment 1.
- Yellow bullhead occur in Segment 1.
- Striped bass occur in Segment 1.

Pages 29 and 30:

These maps should reflect the revisions suggested for Table 2, Page 28.

Page 31, Paragraph 3:

Striped bass and channel catfish should be added to the list of species which enter the mainstream near Spencer and Surprise Canyons

Page 31, Paragraph 5:

The flannemouth sucker is not legally used as a bait species..

The mountain sucker is legally used as a bait species in Lake Mead.

Page 31, Paragraph 6:

Largemouth bass are not considered uncommon in the river below Hoover Dam.

The humpback sucker is more numerous in Lake Mohave than it is in Lake Mead.

Page 31, Paragraph 7:

A bonytail chub was caught by an angler below Davis Dam on July 14, 1979.

Page 32, Top of Page:

Take and possession of white sturgeon is not prohibited. Arizona allows take with no bag or possession limit.

Page 32, Paragraph 1:

The fish fauna in the main channel from Davis Dam to Lake Havasu is not sparse or absent. Threadfin shad, striped bass, rainbow trout, channel catfish, and carp are all common in this portion of the river.

Page 32, Paragraph 2:

The last sentence is inaccurate. Striped bass concentrate below Davis Dam during spawning, as well as utilize numerous eddies and pool areas from Davis Dam to Topock.

Page 32, Paragraph 3:

Striped bass also frequent backwaters to seek out prey species such as threadfin shad.

Page 34, Paragraph 3:

The last sentence is inaccurate. Upper Lake Mead is oligotrophic, Boulder Basin is mesotrophic and Las Vegas Bay (which is the most productive area) is mesotrophic to eutrophic (Prentki, Paulson and Baker, 1981). Eutrophic conditions have probably been uncommon since the completion of Glen Canyon Dam.

Page 35, Paragraph 5:

Corbicula sp. are extremely common throughout Lakes Mead and Mohave.

Page 42, Table 3:

The data presented in this table is very confusing and grossly inaccurate.

Page 65, under Recreation/Public Safety, 1st Paragraph:

The following statement appears:

"There is little, if any, coordination among the agencies, as to exactly what function each performs."

This statement is inappropriate in a document of this type. The authorities of the various agencies are not necessarily distinct from each other and there are many cases of concurrent jurisdiction. The laws of the State of Arizona only apply in the State of Arizona although they may be enforced by (from the list in the text of the document) the Arizona Game and Fish Department, the Arizona State Parks Department, the Yuma City Police Department, and the Sheriff's Department of Yuma and Mohave Counties. In addition to those mentioned, any Arizona peace officer may enforce Arizona State Law along the Colorado River within the State of Arizona. There is coordination and cooperation between the various local state and federal agencies at the field level.

Page 66, Paragraph 3:

The first sentence should read "...are associated directly or indirectly with boating." This wording would be more accurate and would include fishing and pleasure boating activities.

Page 66, Paragraph 5:

The first sentence should read -- Laughlin, Nevada, rather than Riviera, Nevada.

Page 68, Paragraph 4:

The following statement appears:

"Public Safety is not a major issue at Lake Havasu. For the most part, the marinas, docks, and campgrounds along the shore of the lake are spread widely enough apart to reduce potential problems."

The Department's boating records for total accidents, accidents with injuries, and accidents with fatalities rank Lake Havasu as either 1, 2, or 3 for all years since 1974. Furthermore, the Pittsburgh Point area has the potential to become an area of significant safety problems if developed over the current level. The London Bridge Cannel area is already a problem area. Overall, the Department believes public safety is a major issue at Lake Havasu.

Page 71, Paragraph 7:

The Yuma Division of the river has considerable fishing use.

Page 74, Paragraph 3:

The third sentence should read -- The Lake Mead and Lake Mohave portions of the river have designated areas where motorized boating is prohibited....

Page EIS-14, Section 4.28:

This section should make reference to "Threatened and Unique Wildlife of Arizona", approved by the Arizona Game and Fish Commission.

Page EIS-14, Section 4.29 Mammals:

Those species which are listed in "Threatened and Unique Wildlife of Arizona", approved by the Arizona Game and Fish Commission, which occur in the permit area should be mentioned.

Page EIS-15, Section 4.34 Reptiles and Amphibians:

This section should list those reptiles found in "Threatened and Unique Wildlife of Arizona", the official State list.

Page EIS-25, Section 5.13:

The following statement appears:

"Construction of bulkhead and rip-rap alignments would potentially result in removal of a limited amount of vegetation near the shoreline, including remnants of mulefat, mesquite, or willow. The cumulative loss of these plants is not considered significant because of the small number and extent of the community."

While the amount in actual value of riparian vegetation may be low, it can be a very important component of the habitat for birds and small mammals. In addition, the overhanging vegetation (over the water) provides an important source of food for fishes, as it harbors a variety of insect life.



Literature Cited

Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Department. Phoenix, AZ 293pp.

Prentki, R. T., L. J. Paulson, J. R. Baker. 1981. Chemical and biological structure of Lake Mead sediments. Tech. Rpt. No. 6, Lake Mead Limnological Research Center. University of Nevada, Las Vegas 89pp.

Suttkus, R. D., and G. H. Clemmer. 1977. The humpback chub (*Gila cypha*) in the Grand Canyon area of the Colorado River. Occasional Papers Tulane University Museum of Natural History, No. 1. 30pp.

RECEIVED  
FBI - PHOENIX  
MAY 13 1989

**BRUCE BABBITT, Governor**

**Cabinet Members:**

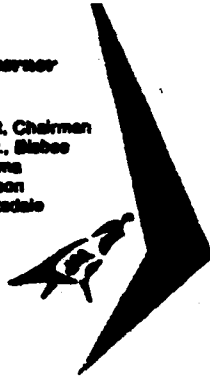
**WILLIAM H. BEERS, Prescott, Chairman**  
**CHARLES F. ROBERTS, O.D., Bisbee**  
**FRANK FERGUSON, JR., Yuma**  
**FRANCES W. WERNER, Tucson**  
**CURTIS A. JENNINGS, Scottsdale**

**Director**

**BUD BRISTOW**

**Deputy Director**

**ROGER J. GRUENEWALD**



**ARIZONA GAME & FISH DEPARTMENT**

*2222 West Greenway Road Phoenix, Arizona 85023 942-3000*

December 22, 1981

Colonel Paul W. Taylor, Commander  
Department of the Army  
Los Angeles District, Corps of Engineers  
P. O. Box 2711  
Los Angeles, California 90053

Re: Amended Comments/Input  
for Main Report and DEIS  
Lower Colorado River  
Proposed General Permit  
September 1981

Dear Colonel Taylor:

This letter serves to amend the Department's response of November 12, 1981, concerning the above-referenced document.

Subsequent to the Department's original response, we received a copy of the "Lower Colorado River Resource Sensitivities and Permit Criteria Report". After reviewing this report, most of the concerns that we originally expressed have been satisfied; however, we continue to recommend that the maps of the study area (A-1 thru A-14 of Appendix A) clearly delineate the sensitivity areas or areas that were excluded from the general permit proposal.

As a result of the coordination meeting with personnel from your LA District Office on November 19, 1981, in Lake Havasu City, we understand that all Federal lands and Native American lands (reservations) will be excluded from the "general permit". We concur with this decision, particularly for the Native American lands, since most of them are relatively "untouched" and still possess some of the highest fish and wildlife values that exist along the lower Colorado River.

At the November 19th meeting, the Department made a commitment to take another look at privately-owned lands and state lands that

HIS-C-46

AN EQUAL OPPORTUNITY AGENCY

28 DEC 1981

December 22, 1981

lie adjacent to the Colorado River, and to determine which areas could legitimately be included in the "general permit" without compromising existing, significant fish and wildlife values. As a result of our field evaluation, the following is a list of those segments of the river on the Arizona side (by approximate river mile) where we believe the "general permit" could be applied:

- RM 181.2 to RM 182.7 (Lake Moovalya Keys)
- RM 183.5 to RM 183.9 (Branson's)
- RM 185.0 to RM 185.5 (Roadrunner)
- RM 186.3 to RM 186.8 (Sundance)
- RM 189.5 to RM 189.8 (Holiday Harbour)
- RM 190.8 to RM 191.8 (Moonridge)
- RM 245.5 to RM 246.0 (.5 miles downstream of the Needles, Bureau of Reclamation Bridge)
- RM 246.0 to RM 246.6 (.6 miles upstream of the Needles, Bureau of Reclamation Bridge)
- RM 247.35 to RM 248.15 (from 1.35 miles north of the Needles, Bureau of Reclamation Bridge, upstream .8 miles)
- RM 265.0 to RM 265.66 (from Riviera Marina, upstream to the point 100 yards downstream of the Southwest Gas Pipeline crossing)
- RM 265.72 to RM 269.75 (from the point 100 yards upstream of the Southwest Gas Pipeline crossing to the point .25 miles downstream of Holiday Shores Marina)
- RM 270.0 to RM 270.75 (from Holiday Shores Marina, upstream to the point .25 miles downstream of the Silver Creek Wash confluence)
- RM 272.0 to RM 273.0 (the west bank of Section 1, Township 20 North, Range 22 West, G&SRBM)

All privately-owned lands or State lands not included in the above list are considered by this Department as having significant values

Colonel Paul W. Taylor

- 3 -

December 22, 1981

for fish and wildlife -- as emergent vegetation, or as undisturbed shoreline/riparian habitat -- and we recommend that any project proposals that would involve these lands be reviewed on an individual basis, as would those proposals that involve Federal or Native American lands.

We hope that this additional information will aid the Corps in the decision-making for the "General Permit" and the Final EIS for cumulative impacts of past permit issuance on the lower Colorado River.

Sincerely,

Bud Bristow, Director



Robert K. Weaver  
Habitat Evaluation Coordinator  
Planning and Evaluation Branch

RKW:dd

cc: Don Metz, U.S.F.W.S., Phoenix  
Wes Martin, Supervisor, Kingman Regional Office, AGFD  
Don Wingfield, Supervisor, Yuma Regional Office, AGFD



STATE OF NEVADA  
GOVERNOR'S OFFICE OF PLANNING COORDINATION  
CAPITOL COMPLEX  
CARSON CITY, NEVADA 89710  
(702) 885-4865

October 26, 1981

Commander  
U.S. Army Corps of Engineers  
Los Angeles District  
P.O. Box 2711  
Los Angeles, CA 90053

RE: SAI NV# 82300021 Project: Main Report & Draft EIS - Lower Colorado  
River Proposed General Permit

Dear Commander:

Attached is the comment from the following affected State Agency: Department  
of Wildlife concerning the above referenced project.

This comment constitutes the State Clearinghouse review of this proposal.  
Please address this comment or concern in the final decision.

Sincerely,

  
John Wm. Sparbel  
State Planning Coordinator

JWS/sl  
Enclosure



JOSEPH C. GREENLEY  
DIRECTOR

1100 VALLEY ROAD

P.O. BOX 10678

RENO, NEVADA 89520

TELEPHONE (702) 784-8214

October 16, 1981

Mr. John Sparbel  
State Planning Coordinator  
State Clearinghouse  
Capitol Complex  
Carson City, NV 89710

Dear John:

The Nevada Department of Wildlife appreciates the opportunity to review and provide comments on the Main Report and Draft Environmental Statement, Lower Colorado River Proposed General Permit, September 1981, SAI NV # 82300021.

This Department has several concerns about this proposed action.

The State of Nevada claims sovereign right to lands below normal high water mark of navigable bodies of water. It appears that responsibility for these lands cannot be given under a general permit system to other agencies.

The problem of shoreline access for recreation was not adequately addressed. Piers, bulkheads, and docks can impair or restrict movement of shore anglers. This is particularly critical on bordering private lands, where trespass is involved above the normal high water level.

Much of the Nevada shore is not accessible along the waters edge due to steep eroded banks. The gradient areas that allow easy foot traffic should be preserved for fishermen access. The federal lands bordering the river between RM 261.2 and RM 265.5 should be designated for public access along the entire shoreline.

We are not favorable to a general permit system and recommend that each application be considered on potential impacts or merits.

If you have any questions relative to these concerns, please contact this office at your earliest convenience.

Sincerely,

  
Joseph C. Greenley  
Director

VKJ:RCA:pw  
cc: Region III  
Fisheries Division

MS-C-50



**Nevada  
Department  
Of  
Wildlife**

JOSEPH C. GREENLEY  
DIRECTOR

ROBERT LIST  
GOVERNOR

1100 VALLEY ROAD

P.O. BOX 10678

RENO, NEVADA 89520

TELEPHONE (702) 784-6214

February 11, 1982

Colonel Paul W. Taylor, C.E.  
Department of the Army  
Corps of Engineers  
Los Angeles District  
P.O. Box 2711  
Los Angeles, CA 90053

Dear Colonel Taylor:

The Nevada Department of Wildlife reviewed and made comments on the Main Report and Draft Environmental Statement, Lower Colorado River Proposed General Permit on October 16, 1981 (attached). Since that time, we have had the opportunity to review the changes made in the boundaries proposed for the issuance of the general permit for pier construction and bank alteration on the Colorado River within the area of jurisdiction of the State of Nevada. With the removal of federal lands from the general permit area and the limitations put on the type of construction allowed under the permit, the Department of Wildlife would have no objection to this proposal as amended.

Sincerely,

JOSEPH C. GREENLEY, DIRECTOR

A. Jack Dieringer  
Acting Director

AJD:pw

Attachment

cc: State Clearinghouse  
Region III

# COLORADO RIVER INDIAN TRIBES

## *Colorado River Indian Reservation*

ROUTE 1, BOX 23-B

TELEPHONE 602-688-9211

PARKER, ARIZONA 85344

In reply.  
refer to: \_\_\_\_\_

November 9, 1981

Colonel Gwynn A. Teague  
Department of the Army  
Los Angeles District,  
Corps of Engineers  
P. O. Box 2711  
Los Angeles, CA 90053

RE: Comments on Lower Colorado River Proposed General  
Permit Draft Environmental Impact Statement

Sir:

This is to inform you that the Colorado River Indian Tribes will wish to comment on the Draft Environmental Impact Statement to the Lower Colorado River Proposed General Permit. However, we are uncertain at this time whether we will be able to meet the November 14th deadline for comments. We were advised at the public meeting held last evening, November 5, 1981 in Parker, Arizona, that we could write to you now and request that our comments be received after the deadline.

We will endeavor to have our comments to you by the 14th, and at any rate they will not be later than the 20th of November.

Sincerely yours,

*Steven J. Bloxham*  
Steven J. Bloxham  
Tribal Attorney

SJB/rr





# COLORADO RIVER INDIAN TRIBES

## *Colorado River Indian Reservation*

ROUTE 1, Box 23-B

TELEPHONE 602-669-9211

PARKER, ARIZONA 85344

November 24, 1981

In reply,  
refer to: \_\_\_\_\_

Commander,  
Los Angeles District  
Corp of Engineers  
P. O. Box 2711  
Los Angeles, CA 90053

RE: Comments on Lower Colorado River Proposed General  
Permit/Draft Environmental Impact Statement

Dear Sir:

The following are the comments of the Colorado River Indian Tribes on the Draft Environmental Impact Statement for the proposed Lower Colorado River General Permit. An extension of time for the Tribes to make their comments was made by phone call from Andrea Pickart on November 18, 1981 in response to a letter from the Tribe dated November 9, 1981 requesting an extension.

First, the Tribes note that neither they nor other Indian Tribes are listed in the Main Report as governmental agencies with land use regulatory authority. (Main Report pp. 5-7). Rather, the Tribes are listed in the Environmental Impact Statement as a "Native American Group," evidently with a status similar to the other "Interested Groups" who are listed. (EIS p. 36). The Tribes object to this characterization of their status and authority regarding the lands within their territorial boundaries. Tribes are distinct sovereign governments, with authority over the use and disposition of lands within their boundaries. The Colorado River Indian Tribes do not recognize any authority of either the California or Arizona Departments of Fish and Game over lands within the Tribes' boundaries.

Second, the Tribes note that prior to the receipt by the Tribes of notice of the public hearing held in Parker, Arizona on November 5, 1981, the Tribes were never informed of the proposed General Permit, nor were they ever consulted. The regulations in 40 CFR Part 1500, which implement the National Environmental Policy Act, 42 U.S.C. sec. 4321 et seq., provide that a Tribe may be a cooperating agency (secs. 1501.6; 1508.5); required that Tribes be consulted during the "scoping" process (sec. 1501.7); and provide that close consultation with Tribes is required generally where actions are considered with effects

der  
er 24, 1981

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Reservations (e.g., sec. 1506.6 (b) (3) (ii)).

From the maps provided in the Environment Impact Statement, see EIS-A-14 through EIS-A-17, the Tribes are in several places unable to accurately discern which lands are proposed to be covered by the proposed General Permit. Further, some lands shown as under federal ownership are claimed by the Tribes, and the Tribes have never been informed that the Federal Government claims adversely to the Tribes. (See, e.g., lands on California side of Colorado River between RM 127.0 and RM 128.5.)

Because the Tribes have not been previously consulted, and because of their questions concerning which lands are to be included, and which lands the United States Claims as its own, the Tribes hereby ask that a meeting be arranged whereby the Tribes will be consulted about these matters before the EIS is finalized. Without such consultation, the Tribes believe that the Environmental Impact Statement is inadequate.

Sincerely yours,

*Harry Drennan*

Anthony Drennan, Sr.,  
Chairman, Tribal Council

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LOWER COLORADO RIVER PROPOSED GENERAL PERMIT MAIN  
REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT (U) ARMY  
ENGINEER DISTRICT LOS ANGELES CA APR 82

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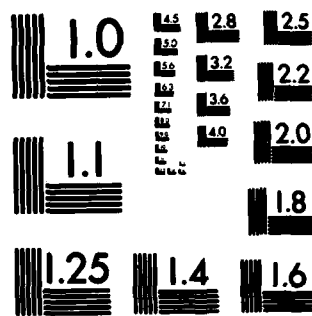
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

# COLORADO RIVER INDIAN TRIBES

## *Colorado River Indian Reservation*

ROUTE 1, BOX 23-B  
TELEPHONE 602-689-9211  
PARKER, ARIZONA 86344

In reply,  
refer to: \_\_\_\_\_

January 12, 1982

Andrea Pickart  
U. S. Army Corps of Engineers  
Los Angeles District  
P. O. Box 2711  
Los Angeles, CA 90053

RE: Comments on Lower Colorado River Proposed General  
Permit/Draft Environmental Impact Statement

Dear Ms. Pickart:

This is to confirm our request made by telephone on January 7, 1982 that the Corps of Engineers delete all areas within the Colorado River Indian Reservation from the proposed General Permit Plan for the Lower Colorado River.

The Tribes have taken the position to seek exclusion of Reservation lands from the general permit areas for two reasons. First, the Tribes do not now have in operation a permitting system which would govern the construction of projects as are to be included in the general permit system of the Army Corps. Were the Army Corps to give blanket approval of certain projects, then the Tribes would be forced to develop a permitting system, or else allow projects to proceed without any Tribal input. Second, the Tribes wish to maintain the status quo unless there is presented good reason to change that status. The Tribes have not been persuaded that the general permit system will work to the benefit of the Tribes, and therefore prefer not to allow such a system within the Reservation.

Because the Army Corps seems not to have received the comments of the Tribes in a letter dated November 24, 1981, I am enclosing a copy of that letter for your records. Because of the consultation that has occurred since the date of the letter, the Tribes hereby withdraw their objections to the Draft Environmental Impact Statement that pertain to the lack of consultation with the Tribes. However, the Tribes continue to maintain that all tribes should be treated

Andrea Pickart  
January 12, 1982  
Page 2

as governmental entities rather than private groups by the Army Corps. The Tribes also still object to the characterization of certain lands within the Reservation as non-tribal lands.

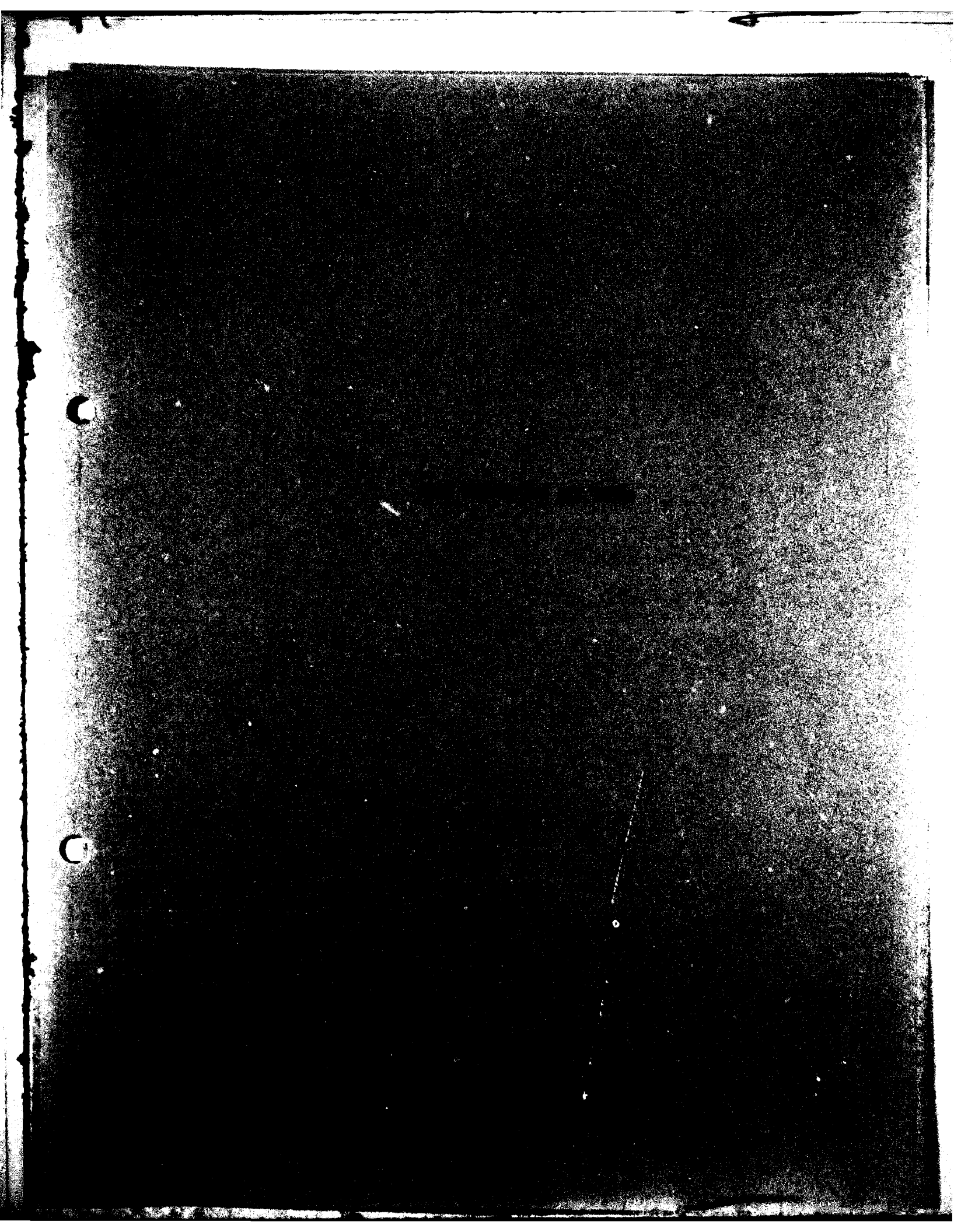
Thank you for your assistance and attention to the concerns of the Tribes in this matter. If we may be of further assistance, please feel free to call.

Very truly yours,

COLORADO RIVER INDIAN TRIBES

*Anthony Drennan Sr.*  
Anthony Drennan, Sr.,  
Chairman, Tribal Council

Enclosure



**Proposed General Permit, Lower Colorado River**

<b>SUBJECTS</b>	<b>Environmental Impact Statement</b>	<b>Main Report (References Incorporated)</b>
<b>Affected Environment</b>	pp. EIS-10 to EIS-23	pp. 21-74
<b>Water Quality</b>	p. EIS-10 para. 4.003 to 4.005	pp. 21-26
<b>Aquatic Biology</b>	pp. EIS-10 to EIS-12 para. 4.006 to 4.016	pp. 26-34
<b>Terrestrial Biology</b>	pp. EIS-12 to EIS-16 para. 4.017 to 4.036, Appendix B	pp. 34-39
<b>Air Quality</b>	pp. EIS-16 to EIS-17 para. 4.037 to 4.044	pp. 39-45
<b>Cultural Resources</b>	pp. EIS-17 to EIS-18 para. 4.045 to 4.049	pp. 45-47
<b>Land Use</b>	pp. EIS-18 to EIS-19 para. 4.050 to 4.060	pp. 47-51
<b>Population</b>	pp. EIS-19 to EIS-20 para. 4.061 to 4.068	pp. 52-61
<b>Recreation/Public Safety</b>	pp. EIS-20 to EIS-22 para. 4.069 to 4.076	pp. 62-69
<b>Noise</b>	pp. EIS-22 to EIS-23 para. 4.077 to 4.082	pp. 69-74
<b>Alternatives</b>	p. EIS-7 to EIS-9	
<b>General Permit</b>	p. EIS-7, App. A para. 3.001 to 3.005	pp. 13-20
<b>No-Action</b>	pp. EIS-7 to EIS-8 para. 3.006 to 3.007	p. 20
<b>Permit Moratorium</b>	p. EIS-8 para. 3.008 to 3.010	p. 20
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<b>Comparative Impacts of Alternatives</b>	p. EIS-8 to EIS-9 para. 3.011, Table 2	pp. 75-77
<b>Environmental Effects</b>	pp. EIS-24 to EIS-29	
<b>Water Quality</b>	p. EIS-24 to EIS-25 para. 5.001 to 5.007	
<b>Aquatic Biology</b>	p. EIS-24 to EIS-25 para. 5.001 to 5.007	
<b>Terrestrial Biology</b>	p. EIS-25 para. 5.008 to 5.012	
<b>Air Quality</b>	pp. EIS-25 to EIS-26 para. 5.013 to 5.015	
<b>Cultural Resources</b>	pp. EIS-26 to EIS-27 para. 5.016 to 5.024	
<b>Land Use</b>	pp. EIS-27 para. 5.025 to 5.027	

(INDEX cont.)



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Noise	para. 5.034 to 5.037 p. EIS-29	
List of Preparers	para. 5.031 to 5.033 pp. EIS-30 to EIS-32	
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